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THE
INOCULATOR;
OR,
SUTTONIAN
SYSTEM OF INOCULATION,

FULLY SET FORTH IN A
PLAIN AND FAMILIAR MANNER.

BY
DANIEL SUTTON,
SURGEON,

Who introduced the New Method of Inoculation into this
Kingdom in the Year 1763.

TUTO, CELERITER; ET JUCUNDE.

London:

PRINTED FOR THE AUTHOR,
BY T. GILLET, BARTHOLOMEW CLOSE,
AND SOLD BY C. DILLY, IN THE POULTRY,
AND J. OWEN, PICCADILLY.

1796.

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PREFACE.

THE practical part of the following Work is the result of a very extensive practice, and an unremitting attention to the small-pox for near forty years*, founded neither on ancient nor modern authorities, but deduced from observations of my own : not that I had neglected to consult, or held in contempt, such valuable relics ; for in most instances we find those venerable monuments of human wisdom

* The Author was inoculated in the year 1757. The three following years he was in the daily habit of attending to the small-pox : from that time to about the beginning of the year 1763, he acted as an Assistant to an eminent Surgeon and Apothecary on the confines of Essex, where he had also frequent opportunities of attending the sick who had caught the disease in the natural way. It was under this practitioner that he first meditated the idea of attempting an innovation on the system of Inoculation, which he afterwards put in practice at Ingatestone, in Essex.

of too much importance to be passed over unnoticed. The fact was, I could not reconcile their diagnosis of the small-pox with what (to my mind at least) daily experience and observation seemed to contradict. Indeed, they had been entirely silent as to what respected the knowledge of the indications preceding the eruptive symptoms: here they conceived the disease began, and they looked no farther back. Assuming the liberty to take a more comprehensive view of the subject, I did not, in this state of doubt, perceive myself compelled to abide by opinions and doctrines irreconcilable and incomprehensible, much less have I ever been the slave to prejudice.

It has been well remarked, that prejudice has such an effect upon the human mind, if indulged and cherished in our early years, and especially if drawn from objects of great veneration, that it is the most formidable enemy whatsoever to innovation and improvement in any art or science; and this prejudice, when attached

to

to physic, becomes, perhaps, more unfortunate. In particular instances, it takes such complete possession of the mind, and so clogs the reasoning faculty, that in the ordinary actions of life, its sterilizing influence is every where discernible. Thus it happens that youth, after being trained up under profound masters, who have unfortunately adopted erroneous principles, can seldom, if ever, disentangle themselves from precepts early imbibed, so as to strike out new lights or improvements. Although, I grant, much deference ought ever to be paid to the voice of instruction, yet should the juvenile reason also be permitted occasionally to question the solidity of precept, and to scan the foundations of doctrine. A practice of this sort, indeed, would enable them afterwards, when such precepts are brought to the test of experience, to view them either with an eye of doubt or of approbation; and thus fortify their minds with courage and discernment to make the most profitable use of lessons so received.

Zealous in the cause of human preservation in general, and willing particularly to extricate the practice of inoculation from that series of process which I conceived to be redundant, and foreign to the true purpose, it would have been idle in me to have attempted the discovery of a more certain, or a more successful system of practice, on foundations which I strongly suspected to be fallacious: it would have been to pursue a phantom in expectation of finding a substance.

Impressed with these opinions, I was naturally led to revolve the subject in my mind, and to consider the disease in a new point of view. In order to this, many circumstances, from time to time, had presented themselves, and contributed to pave my way for the clearer groundwork whereon to build a new superstructure of practice. The difficulty which prevailed amongst the old practitioners, of ascertaining who were favorable or unfavorable subjects for inoculation from external appearances; from the state and
condition

condition of the blood ; from the manner of living ; and from the equivocal effects produced by a very long preparation, medicinal and dietetic, so fondly considered as alteratives ; all these circumstances being duly weighed, I began to suspect that the various shades and degrees of the disease so frequently experienced in practice, must arise and be the consequence of some proportionate peculiarity, some very distinguishable aptitude for infection or fecundity (if we may so term it) of the skin, independent of, and totally unconnected with, the state and condition of the blood. Here then commenced the first datum, or corner stone, on which to ground my principle of innovation.

Having proceeded thus far in my train of hypothesis, I next considered what method must be pursued, in order to reduce or abate a supposed variolous fecundity inherent in the skin ; and this material point I digested and arranged, so far as the effects of a concurrent use of food,

physic, exercise and air, might safely go. I then cheerfully adventured to put my new system in practice; and to my great felicity, a degree of success soon followed, far exceeding any thing that had gone before. As I advanced, various little imperfections and errors were discovered, which I hoped time and observation might remove, and herein also I was not disappointed.

I had an intention long since to have submitted my routine of practice, as it then stood, to the public eye; but almost every year producing some new information of real use to mankind, I determined to wait (and have done so from year to year) until I could conscientiously give to the world, A PLAN OF INOCULATION, perfectly safe and easy, even under the most untoward prognostications that have occurred in the history of near one hundred thousand instances of inoculation, in which I have been either immediately employed, or have had some concern, in consultation with others.

The

The point of excellency, at which every practitioner in this peculiar science must anxiously wish to arrive, is the ability to produce a benign small-pox, and that too uniformly on each and every patient, how dissimilar soever they may be in age, constitution, and natural tendency to the disease : this power obtained, the object is completed ; and all anxiety for the event in the parties interested will be done away.

Persuaded of the utility and competency of the ensuing Work to produce this effect, I here present it to the more immediate consideration of YOUNG STUDENTS IN PHYSIC AND SURGERY ; nor have I the least doubt, that, on entering into practice, thus fortified, they will, under divine Providence, be enabled to conduct their inoculated patients through the small-pox, not only with perfect ease to themselves, but in every instance to the satisfaction of their employers.

To

To those also who may present themselves or others for inoculation, one hint before I finish is offered, of the most essential importance. I particularly recommend confidence in the operator ; together with a strict attention and constant submission to such advice as may be given by him from time to time ; and they will have no reason either to repent of their own confidence, or to censure the proceedings of a judicious practitioner.

I have thought it most proper to divide the Work into two parts : The first contains a variety of remarks upon some prevailing popular opinions concerning the small-pox, with incidental theoretic observations on the nature and peculiarities of the disease, as suggested by a great many facts. The second part principally relates to practical experiments and the treatment of patients. In the course of this arrangement, I have been in some measure compelled to deviate from the general modes of medical authors, who very properly set out with assigning causes,

causes, diagnostics, prognostics, and then stating the regimen and remedy. Let it however be observed, that my system of practice is designed rather to prevent the consequences of a serious disease than to combat with it; and for this reason it is, that I am obliged to go farther back, and begin with the subject matter as it naturally arises.

Hence I have deemed it my duty to consider: First, The subjects for inoculation. Secondly, The method of infecting patients. Thirdly, The anti-variolous diet and medicines. Lastly, The indications as they arise during the progress of infection, with directions for the use of the medicines, on each day of examining the inoculated patient, according to the various tendency of such indications; concluding the whole with observations on, and the treatment of, accidental cases, and of such peculiar symptoms as sometimes take place in the progress, but not necessarily connected with the disease.

ADVERTISEMENT.

WHETHER from any interested or other sinister motive, I neither know, nor wish to enquire; but I find it has been circulated, That I am not the person who introduced the New System of Inoculation:—That I am not the person, who some years since resided and practised Inoculation at Kensington-Gore, in the parish of St. Margaret, Westminster:—That I am not the person, who, in consequence of a very extensive and successful practice, had the honor of Royal Approbation, evinced by my being presented with an especial Patent of Arms: In short, That some other person, having assumed my name, has proceeded to the exorbitant length of declaring, that for many years I had quitted my profession, and was long since dead.

Finding myself, however, still capable of meeting such reports; and being particularly desirous neither to divest myself of that professional character, which I have never disgraced; nor to be sent out of the World before I am really extinct; it is hoped that the insertion of the following Patent may find its apology with my Readers, the only one I can offer them,

them, for thus obtruding a copy, though it be not a FAC-SIMILE of the real Patent of Arms before-mentioned. It may thus possibly contribute to do away the silly reports, either of ignorance or of some less honorable principle; and establish me on that due line and rank, which I have ever wished to hold, as an useful member of society.

Daniel Sutton.

Great Newport-Street,

May 7, 1796.

PATENT

PATENT OF ARMS.

TO all and singular to whom these presents shall come,
Stephen Martin Leake, Esquire, Garter Principal King of Arms, and Sir Charles Townley, Knight, Clarenceux King of Arms of the south, east and west Parts of England, from the River *Trent* southwards, send greeting. Whereas those ancient badges or ensigns of gentility, commonly called or known by the name of Arms, have heretofore been, and still are continued to be conferred upon deserving persons, to distinguish them from the common sort of people, who neither can or may pretend to use them without lawful authority : And whereas *Daniel Sutton*, of *Sutton House, Kensington Gore*, in the parish of *Saint Margaret, Westminster*, Surgeon, second son of *Robert Sutton*, of *Framlingham Earl*, in the county of *Norfolk*, Surgeon, by *Sarah* his wife, daughter of *John Barker*, of *Debenham*, in the county of *Suffolk*, and grandson of *Robert Sutton*, of *Kenton*, in the said county of *Suffolk*, Gentleman, hath represented unto the Right Honorable *Richard* Earl of *Scarborough*, Deputy (with the royal approbation) to the Most Noble *Edward* Duke of *Norfolk*, Earl Marshal and Hereditary Marshal of *England*, that he is desirous of having a Coat of Arms and Crest granted, so as to distinguish his family from all others of the name, and did therefore request the favor of his Lordship's warrant for our devising, granting and assigning to him and his descendants such Arms and Crest accordingly; the same to be borne by *Robert Sutton* his father aforesaid, and his descendants : And forasmuch as his Lordship duly considering the premises, and also the qualification of the said *Daniel Sutton*, did, by his warrant under his hand and seal, bearing date the thirtieth day of *July* last past, order and direct us to devise, grant, and assign, unto the said

Daniel

Daniel Sutton, such Arms and Crest accordingly, to be borne and used by him and his descendants, and also by his said father *Robert Sutton* and his descendants. Know ye, therefore, that we the said Garter and Clarenceux, in pursuance of the consent of the said Earl of *Scarborough*, and by virtue of the letters patent of our several offices to each of us respectively granted under the seal of *Great Britain*, have, in allusion to and as a memorial of his great skill and unparalleled success in Inoculation, devised, and do by these presents grant and assign to the said *Daniel Sutton*, the Arms following, that is to say, Argent, a Civic Crown Proper, on a Chief Azure; a Serpent nowed, Or, a Dove of the Field representing each other; and for the Crest, on a wreath of the colours, a demi figure, the emblem of Love, holding the Hymeneal Torch, all proper, with this motto, "*Tuto, Celeriter, et Jucunde*," as the same are in the margin hereof more plainly depicted, to be borne and used for ever hereafter by him the said *Daniel Sutton*, and his descendants, also by his said father *Robert Sutton*, and his descendants, with their due and proper differences according to the ancient usage and custom of arms, without the let or interruption of any person or persons whatsoever. In witness whereof, we the said Garter and Clarenceux King of Arms, have to these presents subscribed our names, and affixed the seals of our several offices, this twentieth day of *August*, in the seventh year of the reign of our Sovereign Lord *George* the Third, by the grace of God King of *Great Britain, France, and Ireland*, Defender of the Faith, &c. and in the year of our Lord, one thousand seven hundred and sixty-seven.

S. Martin Leake, *Charles Townley,*
 Garter Principal King of Arms. Clarenceux King of Arms.
 L. S. L. S.

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THE
INOCULATOR;
OR,
SUTTONIAN
SYSTEM OF PRACTICE.

PART THE FIRST

Contains Remarks on certain prevalent Opinions concerning the Small-pox ; with Theoretical Observations on the Nature and Peculiarities of the Disease ; as suggested to the Author by a variety of Cases and Experiments, in a very extensive Practice of Inoculation ; illustrative of the great Probability of an Organic cuticular Circulation, wherein the variolous increase is generated, and that, in consequence, the Disease is to be classed as cutaneous.

CHAP. I.

Of Sydenham's Opinion on the Small-Pox—Changes which the variolous Contagion may undergo, by diffusion through the Air—Doubts expressed whether the Disease ever becomes epidemic, and whether such a Thing as Epidemic Air did ever really exist.

SYDENHAM, the great illuminator of the medical world, writing on the subject of the small-pox, very candidly says, “What the essence of this disease is, I ingenuously own I know not, by reason of a natural defect in the understanding, common to me, and all mankind.” Thus far I certainly agree with this justly celebrated author.

But with much deference to his exalted abilities, I conceive that he labours under an error, as to the way in which the disease is generated: On this subject he goes on to observe, “But upon a thorough consideration of the symptoms, it should seem to be an inflammation of the blood and juices; in removing which, nature, during the first two or three days, endeavours to convert and digest the
“inflamed

“inflamed particles; which being afterwards
 “thrown out on the surface of the body, the
 “further ripens, and at length totally expels,
 “in the form of small abscesses.” Again he
 says, “The virulent matter occasioning this dis-
 “ease, seems to be of an acrimonious and in-
 “flammatory nature;—whence the pain, heat,
 “redness, swelling, erosion and ulceration;—
 “and also to partake of a caustic and putrefac-
 “tive nature; whence, by its subtle intestine
 “motion, it destroys the texture and union of
 “the parts, and corrupts them. *Its essence,*” he
 adds, “*consists in a peculiar inflammation of the*
 “*blood*; in which nature is employed for some
 “days, at the beginning, in preparing and
 “moulding the inflamed particles, for their rea-
 “dier expulsion to the external parts; but when
 “the eruption is over, *the fleshy parts become the*
 “*seat of the disease.*”

From the foregoing citations, it is pretty clear
 Sydenham must have been of opinion, that the
 variolous principle was absorbed immediately in-
 to the circulation of the blood, without waiting
 for, or receiving any qualification or modifica-
 tion on the surface of the body, towards effect-
 ing a fresh variolous increase thereafter, prepa-
 ratory

ratory to such absorption; that the variolous principle thus diffused and incorporated with the blood, caused it to be corrupted and inflamed in such a manner, that a fever was the inevitable consequence, so as to produce a depuration or clarification; and that after a due separation of the "inflamed particles," they were expelled to the surface, there to collect and form pustules. In this way clearly he meant the disease should be characterized.

This doctrine coming from a man of such eminence, was universally adopted, and the disease was treated accordingly, until by "*down-right blundering and by accident, as a late Author has expressed himself, I stumbled**" upon motives and reasons which induced me to doubt the truth of it, and to differ in opinion with the practitioners of the day: true it was, that long before, and even after that time, I suspected both their practice and principle were founded in error.

Bad health being totally out of the question, it was maintained that one age was preferable to

* See introduction to Dr. Dimsdale's pamphlet, published in 1766.

another:

another; that one complexion had the advantage of another; that certain habits and practices of the subject imported success or danger; that the season of the year had its influence; and lastly, that a benign disease must result from habitually pure blood, and on the other hand, a malignant disease was as sure to follow gross impure juices; to all these and many more such like ill-founded opinions, the disease daily gave the lie direct.

Scarcely two inoculators, I observed, held precisely the same practical tenets, every one had a method of practice, in some material instance different from others, and peculiar to himself; hence, I suspected neither of them were in the right, and which most certainly stimulated me to adopt other ideas, and to take the most rational means I could devise of obtaining more satisfactory information to improve the practice of inoculation. Many circumstances at this time concurred to assist me in my views, which it is not now necessary to enumerate, (a few of them however will occasionally occur hereafter, as explanatory of some striking facts) suffice it at present to say, that having digested a new plan upon equally new grounds of

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reasoning,

reasoning, I waited a favourable opportunity to put it in practice, and to my great joy and surprise, was soon convinced of its superiority beyond any thing which had preceded it; yet still I perceived it was by no means near perfection. I doubted not, however, but that a few more experiments pursued with prudence, would bring the trials to still greater certainty, the truth and success of which essays, time has since fully evinced.

With respect to the peculiar miasma, or contagious essence, whatever it may be, should such a thing specifically and abstractedly exist, (which as yet appears rather questionable) it is certainly of a nature too subtle, minute, and volatile, to be ascertained by any analysis yet known, nor have its contents been hitherto discovered by the help of our most perfect and compound microscopes. The greater probability, therefore, is, that two different bodies, neither of them variolous while insulated and alone, may, by coming in contact with each other, produce a third body, and so constitute what we all understand by a contagious variolous essence. Be this however as it may, it remains for us to judge of the cause simply by its effects—and to do this upon true grounds,

grounds, we must consider the matter in question, as it affects the human constitution; as it attacks the human frame only; and that but once throughout the course of human existence.

The lot of singularity has fallen on me here also, as on a former occasion upon this subject, to reason and therefore to act differently from my predecessors in the science of healing. Should I be equally fortunate in explaining my ideas on this head, as I was in the practice before alluded to, I shall think myself happy in having done a service to humanity.

In order to this, I shall begin the subject with considering the state and the alteration which this contagious principle may be supposed to undergo while it exists in the air, and whether such a thing as epidemic air did ever really exist.

The volatile principle, (admitting it to be contagious and variolous,) after evaporating from the pustules, is certainly diffused in the air; but how long, and to what extent it may float and remain in it, before its contagious influence is destroyed, will be difficult to ascertain, as the motion and congeniality of the air

are not always the same. It may be presumed, however, to exist in this floating state only for a few seconds of time; otherwise the disease would soon be disseminated to any distance, just as the winds might casually waft it. Now this does not appear to be the fact.

The air which is supposed by Philosophers to possess a solvent power, may by a certain degree of action, so triturate or grind to pieces the variolous effluvia, as to render them incapable of exercising their contagious influence, when in that state they come in contact with the human body. No longer, therefore, I presume, than the particles of the variolous essence retain their humid state and perfect shape in the air, are they capable of acting with a contagious energy. It has been said indeed, with what truth I know not, that the power of variolous infection has remained twenty years, or more, in clothes secluded from the open air, in chests, &c. and that its contagious activity has afterwards been experienced: But of this I have my doubts; and perhaps it were better for us to suspend our belief till we have more certain evidence of the fact than has yet been given.

I have

I have met with no instances, in near forty years of constant practice and unremitting attention, that could induce me to credit the existence of a variolous epidemia, let the season or air be ever so favorable for nourishing or dispersing a variolous effluvia; for until such air is impregnated or charged with such effluvia, no attack of this kind is to be feared. A morbid state of air, unimpregnated with variolous effluvia, can neither give nor engender the disease; the visitations of it therefore must be fortuitous, and arise from another cause. We seldom, if ever, hear of variolous epidemics prevailing, in cold, inclement, unsocial seasons, even in large populous places; much less in retired country situations; and that for this obvious reason, in such seasons people are less inclined to go from home; whereas in temperate pleasant weather, although in itself possessed of no peculiar qualities to propagate variolous contagion, people are generally apt to associate more together. This I apprehend is the cause why the disease is then more rapidly and extensively diffused than at any other time; and of course such seasons may have been esteemed epidemic, however ill founded the idea.

Admitting

Admitting the small-pox to be sometimes epidemic, and the contagious air in moderate motion, surely in such cases, all the inhabitants within reach of its current, who had not previously experienced the disease, would be affected with it, until the air had received a purgation : but in these imaginary epidemics, neither all, nor perhaps one half of the human species, within the sphere of the contagious current ever do experience it ; neither is it propagated at the same instant of time, as it must nearly be were it epidemic : and although the same kind of air may be very frequently in motion, yet are its supposed epidemic consequences never experienced, I presume, until a fresh, thick crop of inhabitants is found ready in waiting, perhaps seven or ten years together, to receive its visitation.

But suppose for a moment, and for the mere sake of argument, we should consider epidemic air to be of a stagnant nature, and to arise, with all its fecundate foulness, like a fog, in a perfect calm. In this case too, we gain not a step in advance ; since every human being within its circumference would at the same time fall ill of the disease, or nearly so : but this is not the character

character of modern variolous epidemics ; they must be indulged (when they have got a supposed footing) with plenty of time, one, two, or three months, in order to effect and complete their deleterious purposes ; and even then, one half of the inhabitants, without flying from the pestilential flagrant air, should they be tolerably cautious, will escape the contagion. In short, without calling in the aid of variolous epidemic vapour, engendered only in the established systems of error, we shall find on full investigation, that the small-pox is invariably communicated by infectious persons or things, coming in, or nearly in contact with those who have not had it, either by accident or by design, though oftener for some interested or other purposes.

CHAP. II.

Of the common Opinion respecting the Manner in which the Animal System is affected.—Reasons for dissenting from such Opinions, founded on Experiments and Observations.—An Experiment demonstrating that inhaling infected Air does not communicate the Small-pox.—Other Experiments, to prove that every Part of the human Body within the Skin is not affected by, or susceptible of the variolous Contagion, so as to generate the Disease.—Effects produced by the Application of Epispastics.—The variolous Increase before the Formation of Pustules, supposed to be removeable.—Effects produced by local Applications of Heat or Irritations, illustrative of a supposed cuticular organic Circulation.—Of a Revulsion of the variolous Matter.—Inferences resulting from these Experiments, and Effects.—Remarks on the organic Powers; and on the Mode in which a variolous Increase takes Place on the Surface, and that in Cases, at two separate and distinct Times.—An internal Absorption

Absorption admitted.—The variolous Fever fallacious.—The Blood exonerated from sundry Imputations—Probable Effects produced by natural Infection, on the Accession of variolous Effluvia.

IT has been a received opinion of the Faculty, from Sydenham down to the present time, that the small-pox was generally propagated by the inhaling of infectious air into the lungs, the lacteals whereof conveyed it to the blood, and other circulating fluids ; or else in consequence of an unqualified absorption by the pores. Through these channels of conveyance it was supposed that the fluids became inflamed and corrupted ; and as these were more or less affected, that the disease afterwards was produced on the surface in a greater or less degree : at all events, however, it was concluded that the blood must be contaminated, or that the disease could not be produced.

While I was even in a state of pupilage, I had frequently observed, that the practitioners of the day could seldom or never judge with certainty, in what degree their patients were likely to be affected : those whom they esteemed to have the purest blood would have the most malignant

malignant sort of small-pox, by inoculation, and those, on the other hand, whose blood was supposed to be the most corrupted or corruptible, had it often times in the mildest way: from hence, therefore, I very naturally perceived that no useful or certain conclusions could be drawn from such opinions. They were, I suspected, equally wide from the truth in their attempts to ascertain the mode of effectual access and the cause of variolous increase. To clear up these points to my own satisfaction, on entering into practice for myself, seemed an indispensable duty. I accordingly made and repeated an experiment, which proved first, that the disease was not to be caught by inhaling infected air.

Having contrived a machine through which a person might inspire contagious air without danger of being absorbed by the lymphatics of the mouth, in its passage to and down the wind-pipe to the lungs; I placed it in a proper position, and prevailed upon a person to use it; I instructed him in what manner he was to draw in one single breath of the infected air, and then to forbear from respiring, until he should be thought out of danger of imbibing it in any other way. This done, and having also procured

cured a patient in a most infectious state, and taking advantage of a proper current of air, we then proceeded to trial.

The experiment being made to my satisfaction, we waited the event for fourteen days, when another opportunity offered to repeat it. No symptoms appearing of the person having been infected from the first and second attempt, at the end of about three weeks more, another opportunity presented itself, and we proceeded to the third and last trial. Each proving ineffectual, at the close of eight weeks from the first experiment, the person who inhaled the infected air having occasionally, to prevent sinister accidents, undergone a strict preparation, was successfully inoculated in the usual way, and met with only the usual symptoms attending that process.

I have also repeatedly tried to communicate the disease, by conveying considerable quantities of active virus into the stomach, in the form of pills, but never with effect; both cool and tepid clysters of water, strongly impregnated with the contents of many ripe and unripe pustules, have likewise been administered; but, in
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this way too, I have always failed of communicating the disease.

I had observed, that it was not unusual, by the old way of making deep incisions, to experience frequent disappointments in communicating the disease. It was therefore determined, if I could, to trace out by experiments the source of these accidental failures ; as thinking they might, at the same time, lead to the still more important object I had in view ; namely, to discover in what manner, and to what congenial parts of the human body, the variolous particles did actually attach, so as to generate their increase. To this end, in the course of my early practice, I sometimes made, by way of experiment, two incisions ; one in the present superficial way, which I could depend upon ; the other on the other arm, longer, and very deep, completely through the skin, and into the flesh. Into this wound I dropped a short piece of thread, fresh charged with active matter, which not having touched the cuticle and true skin, in its way to the bottom of the wound, it was instantly closed, and a piece of plaister applied, both to secure the lips together, and to prevent the matter, at the same time from rising

rising to the skin. Five or six days after, the plaister was removed, but no signs of infection then or afterwards were discernible on the part so inoculated ; and this, on repeated trials, was invariably the result, although the superficial incision on the other arm as constantly proved successful.

It having been confidently insisted upon, as a principle founded, I suppose, on Sydenham's opinion, that the blood of a person under the pressure of small-pox would impart the disease to others : not being myself inclined to credit this assumption in its full extent, I was determined to satisfy myself as to the truth of it. To this end, I began by inoculating with blood drawn in a febrile stage of the disease, which indicated confluency, and proceeded in this way daily, till the latter stage of the disease, where an absorption had evidently taken place. Numerous experiments of this sort were tried, but all without effect. In making my experiments from a subject in the pustulous stage, I used the precaution to wash and wipe away all infectious matter which might adhere to that part of the skin whence the blood was taken, and not even then content with such experiments, I ordered

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the blood to be smelt to, and to be well rubbed in upon the skin, on different parts of the body of the subject to be infected, yet herein also I failed in every instance.

The tumified axillary glands of inoculated subjects will sometimes suppurate at a time when the disease, in consequence of inoculation, is advancing to its crisis, though oftener on its decline ; but in neither case will the matter discharged from such abscesses communicate the disease : having, for my own satisfaction, occasionally tried it without any variolous effect : nor will abscesses formed during any stage of the disease on any part of the body, from a small-pox subject in the natural way, be at all more effectual.

In my attendance both on the natural and inoculated small-pox, I had observed that variolous pustules were seldom to be found in cicatrices ; and never on such as succeeded deep wounds, or where the flesh had to a very large extent been deprived of the true skin. These observations led me to conceive that I might not be able to ingraft the disease on the centre of such cicatrices. But two or three opportunities

nities have presented themselves for me to make experiments, in which I have always failed of success. I am aware, indeed, that the disease may have been effectually engrafted on small superficial cicatrices, such as follow scalds, or burns, or on parts where old issues have been healed up, and that spontaneous pustules may have proceeded from them, and arrived at full energy and maturity. In these rare instances, however, notwithstanding the parts so marked may have the appearance of perfect cicatrices, yet the cutis might not have been wholly destroyed, so as to prevent the possibility of its shooting a-new, although the parts sustained the outward character of a complete cicatrix: we must consider large cicatrices, therefore, as being no more than a kind of hardened flesh, and although absorbent and nervous vessels may obscurely exist, I believe them to be too small and imperfect for the vorolous miasma to be absorbed, or a variolous increase to take place on such cicatrices.

It has been a generally received opinion, credited even by some of the Faculty, and propagated as a truth, that pustules do sometimes pervade the internal parts of the body; and this circumstance has been assigned as one of the

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reasons

reasons for such cases sometimes turning out fatally. To satisfy myself as to the truth of these opinions and reports, and to destroy prejudices founded, perhaps, on certain alvine appearances, I was resolved to take the first opportunity of dissecting a proper subject, who should be supposed to have died from this cause, conjointly with others. A negro having on the ninth day died of a confluent small-pox, I had permission from his master to open the body ; but on examining every part of the viscera and their investiture, (the peritoncum) not a pustule was to be seen, or any thing which had the resemblance of such an eruption.

I was called in to a man in the eruptive fever, which indicated an approaching confluent small-pox. From the nature of the symptoms, I was of opinion that a vesicatory applied to his back would have its use, and as I conceived, no time was to be lost, I waited the arrival of the plaister. Upon clearing away the linen to make the application, we observed the general surface of the back and loins to be covered with a vast number of little red spots, which in the event proved to be real small-pox. The following morning the disease was fully manifested over
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the whole body, and having now obtained my object, the plaister was removed, but the scarf-skin adhering generally to the plaister, I ordered an emollient one as a covering to the part. Two days after, on examining the man's back, I observed the pustules on all other parts to have made a considerable progress, but on the place where the vesicatory had been applied, no pustules were to be seen, and the new cuticle being formed, only a redness of the skin remained without a vestige of pustules, although on every other part of the body the eruption was formed in the most violent degree. This case not only proves the variolous increase to begin and end immediately under the epidermis, but it shews also to a demonstration, that the accumulated contents of a pustule, even before its crisis, may not be entirely variolous, for if it had been possible, with safety to the subject's life at that time, and by the same means to have separated the whole external covering of the man's body from the true skin, he would have been cured of the small-pox in twelve or twenty-four hours, and relieved from the mass of matter which otherwise would have ordinarily accumulated in the shape of pustules.

I am much inclined to believe that the spontaneous increase, before the formation of pustules, are removeable and determinable to any part of the body, and I shall here give an instance in support of this hypothesis, by what I call *invitation*. Suppose, for example, that a person to be inoculated wishes to have the initials of his name put upon his face, and formed with all those pustules which would otherwise have been produced spontaneously over the body; and we must further suppose, by the progress which the incision makes, that we may judge pretty accurately, allowing for difference in the size of pustules, as to the number to be thus spontaneously produced, which, for instance, may be fifty or a hundred. Now fifty or a hundred invitations, or dots with the point of a charged needle, being very lightly made in the form required, about forty-eight hours antecedent to the eruptive fever, the whole spontaneous produce would by such means assemble, or be invited to the face in that shape. Should the whole produce, however, not have been sufficiently numerous, some of the invitations will fail, so as to leave chasms in the letters intended to be marked, and in case of an excess, the overplus will appear spontaneously. This was no
unfrequent

unfrequent practice with me many years ago, and a practice attended with no future inconvenience or blemish to the patient.

By whatever cause a preternatural heat is produced on the skin, whether from fire, or friction, or from any stimulating matter applied, (for it is indifferent which) the heat so produced, has been found powerfully to solicit a variolous increase to such parts: The generative organs, as I apprehend, being by any of the foregoing accidents immediately brought into an invigorated fecund state, in such a way as to produce an accumulation of eruptions on the part or parts so heated; I cannot conceive that this would have been the case, without the aid of such preternatural heat, but that such eruptions would otherwise have been indiscriminately scattered over the body, nearly in the ratio of the increase so produced on the heated parts. For instance, where a considerable fecundity on the skin is foretold by the indications of the incision, or otherwise, and accidents of this sort happen, such parts will, in consequence of such heat, &c. &c. experience an accumulation of pustules, even to a degree of confluency; but where the indications foretel the mildness of the

approaching disease, the like consequences do not follow, at least not to any considerable extent. From hence, therefore, it may be presumed, that the stimulus acts as an invitation of the eruptions to such parts; and indeed I have oftentimes been led to believe, that the eruption over the general surface of the body has been lessened by this local revulsive accident.

Formerly it was an opinion, that a revulsion of the variolous matter, supposed to be contained in the habit, might be made from the face, by inoculating on the lower extremities, but it was founded in fallacy; for the stimulus occasioned by such inoculation was too confined and local to produce the effect in any suitable extent. Indeed all inoculations must be considered in the first instance as only productive of the local increase on the arm, and do not affect the extent or situation of the second or general crop. The effects of the stimulus before alluded to, are only to be produced when the first increase has taken place, when its contents are diffused over the true skin, and the process is near to the approach of the eruptive symptoms preceding the second increase. The reasoning, therefore, of that time, must be, as I observed,

I observed, built on false grounds, for this kind of revulsion was imputed to the office of the blood; whereas, I apprehend it to proceed from some organic circulation, existing between the cuticle and the true skin.

From the information which the foregoing instances afford, together with what is obvious to our sight, on the place, and at the instant of inserting crude matter by inoculation; from the knowledge to be gained in strictly attending to the texture of the skin of the subject on whom the operation is to be performed; and lastly, from the progress of infection on the arm, (all which will be explained under their proper heads) I am decidedly of opinion, that some fecund, influencing principle, whatever it may be, but having a peculiar power over the variolous essence, does exist entirely upon, and pervade the superficies of the true skin, I mean between that and the scarf-skin; perhaps in certain ramifying capillary vessels, or glandular points thereof, which in a natural state unite the skins together. It is probable that in these superficial glands an organization may subsist, connected with the sense of feeling, as being situated on the extremities of the nerves; and

and that this organization may be vascular, containing a circulating, volatilized, saline, sebaceous fluid, peculiar to itself, and serving to a variety of natural purposes, before its excrementitious parts are thrown off from the habit, by the pores of the skin. But, whether an organized body exists here or not, my opinion is the same; viz. that the contagious effluvia, or in a humid state, are attracted through some one or more of the pores of the cuticle, and coming into contact with the influencing principle, by some kind of electric collision, or otherwise, a variolous increase immediately begins to be produced or engendered therein, on the accession of the variolous infection.

The new variolous increase being produced either from a casual or determined point of attraction, in the manner I have described, is then received into the lymphatic system, the superficial parts whereof, which lie on the surface of the true skin, deposit their variolous contents, and by some attractive influencing power in the organs of generation, a farther increase takes place, of a general productive nature, according to the degree of fecundity existing in those organs.

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By the lymphatics of the biceps muscle the variolous particles are conducted to the conglobate glands of the axilla, which cannot otherwise be affected, and it then proceeds to the thoracic duct: From this duct, as the central point, it may be diffused through every part of the human body; and in its circulation, should any of the variolous essence take its course through the Fallopian tube, by a certain attractive power, which I apprehend to be inherent in every uncontaminated human skin, a foetus may thus experience its contagious effects, but not otherwise; and in that case, there the variolous essence loses its force and becomes exhausted. Such parts of the variolous essence as did not take that course, are sent forth from the thoracic duct, and thence introduced into the blood; but from the great heat and rapid motion of which, the variolous energy is thereby immediately destroyed, and the disqualified matter is thence conveyed to the superficies of the body, and discharged by the ordinary emunctories as excrementitious humour.

I have mentioned the particular muscle and lymphatics of the arm, when the operation is there performed, as the only course from thence
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to the thoracic duct; for this reason, that neither the axillary glands of the other arm, the inguinal glands, nor indeed any of the other lymphatic strainers, are ever sensibly affected by inoculation when the operation has been performed on any other muscle of the arm; or on any other part of the body that I have experienced, and the axillary glands of that arm only in which the incision was made.

It also clearly appears, from this progress of infection, that there are two distinct increases of the variolous principle, produced immediately under the cuticle of the same subject, the one I term local, the other spontaneous; the first instantly begins with the insertion of the infectious miasma, and ends at the commencement of the vesication of the incision. The second increase, which I call spontaneous, commences with the first symptoms of an approaching variolous fever, and terminates with the first appearance of the general eruption, while they are seen as only so many little unsubstantial red or inflamed spots, before they have, to the touch, acquired body, or are arrived to a state of vesication; for when this stage of infection takes place, either on the incision, or in the second or spontaneous

spontaneous eruption, every such little spot begins to fill with a species of nutritive lymph, designed for some healing purpose or other.

I am not willing to give too much credit to the effects produced by the application of the vesicatory to the man's back, as before stated, but I am nevertheless much inclined to believe that the case demonstrates two facts of much importance to my general hypothesis of the small-pox being cutaneous. The first is, that the spontaneous increase of the variolous principle, (no less than the local) is fully completed by the time above stated: and secondly, that the albuminous lymph, which afterwards enlarges the pustules, is not, of course, wholly variolous, although too intimately united to be separated from each other; for it has frequently been found, by inoculating with matter in the latter part of the concocted state of the pustules, when the more volatilized variolous particles of it have been evaporated, that the matter will not communicate the disease.

Notwithstanding the human constitution may be more disastrously and differently affected

affected by the small-pox, than by any other cutaneous disease; it ought nevertheless to be considered as strictly cutaneous; its principal actions and effects being, as I conceive, produced on the surface of the body.

I do not mean to contend, that when a new increase of the variolous essence has taken place, when the old or parent stock has performed its office, and its energy is exhausted, no absorption of the new increase into the internal parts in any instance occurs. We have manifest evidence to the contrary; for, about the fourth or fifth day after the accession of variolous essence by inoculation, the consequent new increase, as I apprehend, is absorbed by certain lymphatics in the biceps muscle, (as before stated) and its effects from thence are first discovered, by the glands of the axilla, or arm-pit, in some instances, becoming tumefied, stiff and painful. By natural infection also, as well as by inoculation, the evidence of an internal absorption is manifested from the effects produced on a foetus in the womb; instances having happened, wherein such have come into the world with evident marks of the disease upon their skin.

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As to the febrile symptoms, simply, I have seen nothing so specific in them, that we can absolutely determine them to be variolous. Such may precede, and be the consequence too of other obstructions in the skin. It is true, the disease may be guessed at; and on enquiry, if the patient has not had the small-pox, or if he has been in danger of catching it, the prognostication may be this; that the distemper is breeding; but these are only leading enquiries, and betray a doubt as to the point of judging with certainty from the febrile symptoms. I mean not to question the skill of any individual in the profession; but I have had frequent instances, in the course of my practice, of eruptive cases not being determined by them until the eruption had begun to vesicate, and sometimes not even then; for where the febrile symptoms have been very light, and the pustules few, which sometimes happens in the natural way; even at that stage, cases have been concluded to be the chicken-pock, when they really were the small-pox, and *vice versa*. Whence then arises this defect in judgment, but from the fallaciousness of the febrile symptoms?

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From the ineffectual experiments made with the blood, and taking at the same time into consideration, the very great and important functions; the rapidity of its natural motion; the source from whence it receives its supplies; and in what innumerable and perpetual modes it conveys and imparts them to every the minutest parts of our bodies; in short, when it is considered as the soul and source of man's corporal animation; I confess I am little inclined to credit the possibility of its being possessed of an attribute or power to impart any qualification to the absorbed essence, whereby a variolous fermentation may be excited, or to occasion an increase therein.

In order to support this mode of reasoning, some definite quantity of the variolous principle must be supposed to be absorbed, and incorporated with the blood, in the first instance: secondly, that a fermentation, inflammation, corruption and effervescence would naturally follow: and lastly, that the scene must close with eruptions on the surface of the body. In this point of view it ought to be concluded, that these febrile symptoms and eruptions would, with little variation,
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be proportioned either to the quantum of the original influx of the variolous principle, or to some proportionate inherent predisposing quality of the blood; and yet they by no means appear to be the consequence of either: for, supposing the event to be determined by the quantity of the variolous principle absorbed, and that quantity to be very small, a few particles only, yet sufficient to produce and ascertain the disease to be variolous and effectual; in short, supposing the eruption to be in proportion to the influx, which I conceive to be inadmissible, then all those inoculated with the smallest quantity of infection would have the disease the most favourably; and those whose inoculation was accompanied with an excessive quantity of infection would experience the disease in the most formidable way. But the truth is, that this hypothesis is refuted by daily experience, even among those who have the least pretensions to form an opinion; and it is now given up generally by the most intelligent.

To argue from the existence of an inherent predisposing power in the blood of a subject in perfect health, a person must profess some uncommon supernatural talents, to prognosticate

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with certainty, what degree of fermentation, and consequent eruption, will ensue on such a subject. For let me ask what clue have we? what analysis have we of the blood, to ascertain with precision this inherent predisposing power? I confess myself to know of none; and hence I conclude, that all deductions from an enquiry into this imaginary inherent influencing power of the blood must be fallacious. Does the blood, drawn at any stage of infection, exhibit any general known or determinate appearance, to ascertain the fact, which may not also with equal propriety be attributed to some other febrile cause, not even eruptive? Let me own that I have not this discriminating gift; nor have I ever heard of any one that had it.

Suppose we should admit the small-pox pustules to proceed from, and to be the result of some fermentation of the blood, without considering whether this fermentation arises from the absorption either of one, or of one million of variolous atoms; I presume it will be granted, that this fermentation does not take place, until it is discovered by an increased velocity of the blood: or at least, until the patient exhibits some derangement in his health. For it can hardly
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be insisted on, that a fermentation exists in the blood, when no signs of it are apparent, and while the subject continues to be in perfect health ; and yet we are not without cases of this sort in the natural way of breeding the small-pox, since in some instances the first knowledge or suspicion we have of the disease, is the appearance of a few scattered pustules over the breast and other parts of the body ; and these will appear some hours before the commencement of the fermentation or fever, particularly in forward cases, where two distinct crops of pustules are indicated and expected to follow each other, a few days intervening.

But if this fermentation be still insisted upon as the necessary harbinger to the eruption, why should not all human beings be subject to it more than once ? Are all the absorbing, fermenting, inflaming, corrupting, effervescing and depurating powers of the animal fluids, finally and for ever to be destroyed by one and the first accession of the variolous principle ? Shall we, by any analysis of the blood, find the cause of this morbid defunction there ? Do not all those who, like myself, are in the daily practice of visiting the sick, absorb this same princi-

ple into their own personal habits? And why not then experience the same variolous disasters in our blood? Do not gravid women who have passed the disease previous to their pregnancy, and constantly living in infected air during that state, absorb the variolous effluvia? If they do, why does not their respective foetus experience the variolous influence? The truth is, they are perfectly safe, so long as they continue in their native inclosures.

But it may be said the variolous principle when possessed by the blood, may lag in its circuitous course, and groping in the dark regions of the body, may not find its way through the Fallopian tube; and the foetus by this fortunate obscurity may escape the contagious ferment, can this be the fact? when it is no very rare case to see an infant in the 7th, 8th, or 9th month, enter this troublesome world with the small-pox full upon it, provided the mother also is at that time labouring under the like visitation.

This circumstance, it is to be remarked, may extend to something more than is generally suspected: a powerfully attractive or electrical influence may exist, and by this influence, through
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the medium of the nervous system, the effects of the outward skin of the mother may be conveyed to that within, to the skin of the fœtus. I think it does not consequently follow, that because an embryo may suffer an untimely birth, the accident therefore is intirely to be imputed to an absorption of the variolous essence into its circulation; it might perhaps with as much propriety be attributed to the excessive shock which the maternal frame may experience from the disease. Be this however, as it may, I insist not upon it; nor do I take in aid of this hypothesis, the various and frequent accidents resulting apparently from nervous sudden shocks of pregnant women in health; the effects of which are said to be seen on the infants when they are brought forth.

It may also be contended that the general stated time of eight or ten days from the first accession to the febrile symptoms, indicates the probability of this inherent quality of the blood. In this case I apprehend the ferment would be more regular in each class of subjects, than it is really found to be; and which cannot well be attributed even to any particular motion of the blood, or discovered by the pulse: subjects of

any age may experience the febrile symptoms in seven or eight days, others not in twenty, or more; nay, by natural infection, I have had reason to believe, the variolous fever has not commenced even till the thirtieth day from the accession, and this without any apparent sluggishness of the blood, or any other known or reputed cause arising from the season of the year.

On the same ground also I would ask, how it happens that fresh subjects shall have been in infected air, nay, have slept with persons under the confluent small-pox for five, six, or seven nights successively; that they shall then be inoculated and experience the disease in that way, with all and only the ordinary indications of the arm, and without any premature febrile approaches? Instances of this sort, it is well known do frequently occur in practice; in such, I always recommend persons to be inoculated, and have generally found myself in time to bring the disease on, in this way and in the mildest manner. Now in all such cases, I would ask what becomes of the original, natural stores for fermentation, &c.?

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On the ground of a variolous depuration, I cannot conceive why the known, the peculiar and characteristically dented form, and distribution of these excrementitious eruptions, should so invariably follow; for by most of those sensible depurations of the blood we know of, where it is not thrown out by the ordinary emunctories, the matter, generally speaking, is indiscriminately collected in the weakest, the most oppressed or obstructed part; and the magnitude of the repositories is generally proportioned in size to the quantity of depurated matter, and to the predisposing cause.

Could the time and place be discovered, when a variolous particle floating in the air, chanees to be absorbed by an unwounded pore, I have little doubt but that the same contest * takes place, though perhaps in a smaller degree, as when imbibed by inoculation. There is, I humbly presume, under natural infection, some one point or pore of the skin, into which a variolous particle first enters: this then (if effectual) will be the point of locality, or natural insertion, if we may be allowed the expression, from whence

* See Chap. V.

the new variolous increase first and principally proceeds. But, as the precise point of absorption and increase is not on the instant of absorption discoverable, and as we are never certain that the variolous effluvium is imbibed until its effects begin to be demonstrated by the febrile symptoms, the infected local point is seldom if ever discovered previous to the experience of those effects; whereas, if a strict search were made as soon as the disease is expected, the precise point of absorption and increase might always be discovered, and by old nurses, in this case, is called the Master Pock. A few other leading pustules may indeed appear of the same kind, and from the same cause, but the largest, or the first, is that from which, as I apprehend, the spontaneous increase proceeds.

CHAP. III.

Observations to shew the Probability that neither the Motion of the Blood, nor any peculiar Constitution of the Air, has any effectual Influence to aggravate the Disease.—The Number of Pustules not increased by any particular Habit of Body or Manner of Living, beyond the natural Standard of Fecundity in the Skin.

THE different degrees of virulence and irregularity, observed in the progress of infection on different subjects, have been attributed to various causes. Some practitioners have ascribed this difference to the temperament or constitution of the air, or to the season of the year; others to the circulation of the blood; but I never could draw any satisfactory conclusions from either. For in the latter instance, in infants, whose blood is universally admitted to circulate faster than that of adults, we do not in general discover that the progress of infection proceeds faster than that in the oldest subjects ever inoculated. It is equally certain also, that the constitution of the air and season of the year

year have no particuar known influence which can be depended upon to quicken or retard the variolous progress during either the first or second increase. The progress of infection on some subjects of the same family, house or neighbourhood, inoculated at the same time, and from the same subject, will be very dissimilar and unlike, owing principally, I believe, to the different treatment of the subjects during the preparatory course, or from some natural variations in the organs of variolous generation, unconnected with the motion of the blood, or any particular state of the air, even though the subjects may have been twin children.

It is a very generally received opinion, and I believe an erroneous one, that the small-pox is rendered more excessive, and far beyond what nature originally designed it to be, by habitual or casual diseases, by intemperance, or by febrile dispositions in the habit at the time of catching the small-pox, or by a convalescent state from pleurifies, peripneumonics, hooping-cough, consumption; by frights, fears, foul blood, and even from extreme old age. For although most of these may be very untoward circumstances to combat with, when the small-pox is making its
attack

attack in the natural way particularly ; yet I am fully persuaded, from the observations I have made, that the disease is not by all or any one of these occurrences capable of being aggravated, not a single pustule superadded beyond what the constitution would otherwise have suffered, had it been in perfect health : and from hence I draw this conclusion, that in the whole history of the disease, there have been found persons of all ages, but particularly very young children, of the most healthy, regular, and temperate habit, with blood and juices unquestionably the most pure, who nevertheless have been as subject to an excess of pustules, simply considered, as the most unhealthy and intemperate. On the other hand, instances have frequently happened of persons whose habits having been obviously deranged, and charged with impurities, have therefore been deemed bad subjects, yet have they, nevertheless, experienced the disease as favorably as those who enjoyed the best state of health, with only the ordinary preparatives, and without any express attempt to alter or cleanse the habit.

CHAP. IV.

The Eruptive Fever, its Source, and Tendency considered.

ADMITTING, for the sake of argument, that a mere absorption of the variolous essence into the blood, unqualified in the skin, is the cause of the fever, as a necessary preliminary operation to the producing any new increase on the skin; admitting also, that the fever is invariably proportioned to the influx of the variolous essence, how comes it to pass that those who have had the disease, and are in a daily habit of absorbing the contagious essence, should not be attacked with a proportionate variolous fever, according to the influx, as the necessary consequence of such absorption, although no eruption follows; for, as I have already observed, the organic powers of absorption remain absolutely as perfect for health, after we have passed through the disease, as they ever did before. Upon a due consideration, I apprehend, it will be found that the variolous essence on being absorbed, is more offensive to the nerves than

than the blood, and that this sensitive organ, on the superficies of the body, is instantly affected by an intrusion of the variolous principle, as also in its state of progressive increase. By this medium of sensation, intelligence may be conveyed to every necessary part in the animal economy, of the intrusion of whatever heterogeneous matter may enter the pores of the skin, tending, or likely to offend or obstruct the ordinary functions of nature. I do not mean to insinuate that expresses are dispatched from the extremities, as out-posts to the spinal nerves, to the head, and to the heart, in order that all the powers within the animal economy may be put upon their guard; but I conceive that those animal spirits which circulate in this cuticular organization, may first experience the shock electrically, and act as the proximate agent to accelerate the motion of the blood, and that the blood being by this agency quickened in its motion, and propelled beyond its ordinary bounds, a fever is thus constituted. The object, therefore, to be obtained by the eruptive fever is first to expel that which is found to be foreign and offensive to nature on the surface of the body; and, secondly, by its component nutritious particles, to heal such parts thereon as had received injury. Upon
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duly confidering alfo the nature of certain pains which fometimes attack finall-pox patients, whether in the head, in the loins, or other parts, I conclude they may with great propriety be attributed to the nerves being particularly affected; in confequence of an abforption of the variolous principle into that, or the lymphatic fystem.

Hence it will be perceived, that the fever when excited, is not intended to cleanfe the blood from variolous infection; but by an afflux of neceffary lymph, to reftore the injured parts under the puftules to their ufual ftate and tone of foundnefs. This fever therefore, which has hitherto been efteemed cruptive, may perhaps more properly be called *conciliatory*, or *healing*, rather than cruptive and concoctive. However it may be termed, when it is at its crisis, the power of further impregnation and increafe becomes deflagrate or extinguifhed, probably from fome imperceptible diforganization of the attractive fecundific powers inherent on the furface of the true fkin, and fortunately for human nature, never to be re-kindled.

CHAP. V.

Of the Diagnosis, or distinguishing Character of the Disease, illustrated in the denting of the Pustules and their Similarity.—Of the Corrosion or pitting of the Skin after the Small-pox.—Conclusion of the first Part.

THE influencing principle, before considered, having co-operatively induced the variolous effence upon its diffusion on the surface of the skin, to attach to certain prolific points or minute glands under the cuticle, towards making an increase, such glands also, or points, being supposed to be nearly of the same extent: those points receiving an injury in exact proportion only to the quantum of increase, and the necessary influx of the albuminous fluid being consequently proportionate to the injury sustained; and as Nature never acts superfluously or in vain, it follows, in course, that the size of the pustules will always nearly correspond to the increase made of each prolific point, and to the influx of the albuminous healing lymph.

Every

Every variolous pustule, as well as incision, has its central dint in some degree or other; and as the disease becomes hereby principally characterized, it will be found necessary, and may be found of some consequence to the general argument, to assign a reason for this common dented depression of the pustules.

Wherever a particle of the variolous essence is detained in the glandular points, for forming an increase on the surface of the true skin, I apprehend that at every such point of detention a certain degree of irritation and inflammation takes place, and that the fecund part being thereby contracted, some injury, however small, is sustained in the central region of the pustule: hence in its state of yielding increase, and in an early state of vesication, the centre, as I apprehend, is prevented from rising; whilst by the influx of lymph round the point of increase, the margin, or the more outward part of the pustule rises, and fills with such necessary lymph, so as to leave a dint on the centre of the pustule. This phenomenon, as I observed before, characterizes the disease, and shews in a peculiar manner, its singular difference from every other eruption on the skin to which human nature is subject.

Should

Should the increase at such glandular points as before described, be more formidable than ordinary, and the consequent irritation, inflammation, and suppuration penetrate quite through the true skin; a pitting, after the pustules are shed off, will be the certain consequence. It is, perhaps, for this reason also, that in the act of inoculation, the punctured spot receiving a great number of the variolous particles, and the increase being proportionably large, when an incision is made into, or quite through the true skin, such part thus sustaining a proportionate degree of inflammation and suppuration, will ever after have a pitted depression, or scar. The pitting may also be assisted in a certain measure, by some peculiar texture or disposition of this integumental covering of the body.

Conclusion the First Book.

Upon a general review of the whole of the question before us, the following deductions will naturally arise: First, That our prognostications depending on the state and quality of the blood, for ascertaining who are good or bad subjects for inoculation, are not to be depended

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upon. Secondly, That the small-pox being considered as cutaneous, our prescriptions ought not to be directed with a view to a depuration of the blood, but rather to prevent excessive obstructions in the glandular capillaries of the skin. And lastly, That the safety of the subject to be inoculated must depend on our ability to judge with accuracy of what is discoverable on the surface of the body. To this end I am naturally led, in the second part of this Work, to describe, so far as can well be ascertained, who are the subjects favorable or unfavorable for the practice of inoculation, in order that the preparatory preventive course may be adjusted accordingly.

THE
INOCULATOR;
OR,
SUTTONIAN
SYSTEM OF PRACTICE.

PART THE SECOND

Contains Practical Observations, pointing out the personal Signs previous to Inoculation, and the local Prognostics which will afterwards take Place in the several Stages of Variolous Infection; with such Directions for the Treatment, as will, in every Case, give Certainty and Ease to the Practitioner, and greatly contribute to the Security of the Patient.

CHAP. I.

*Of Subjects favorable, unfavorable, and improper
for Inoculation.*

FIRST, of favorable subjects, under two or three years old; those who, being in a perfect state of health, are of a placid, yet undaunted, disposition; those who have had the thrush and red-gum, particularly the latter; those who are subject to slight eruptions on the head, face, and other parts of the body, from teething, &c. those who are fat and fleshy, and whose skin is of a motley appearance; sucklings who live on milk of their own age, derived from temperate healthy nurses; those who are naturally blest with a due solubility of body; who in the night season perspire moderately, and by day have clammy moist hands; those whose skins are of a coarse spongy texture; those who are not restrained from partaking of whatever a moderate table affords; and lastly, those who have not been enjoined or restricted to a long preparatory regimen antecedent to the operation.

It

It must be observed, that it very rarely, if ever, happens, that all the foregoing indications, or indeed one quarter of them, are to be traced in one and the same subject. As we advance further from the age of infancy, some of these indications or personal signs naturally lose their consequence, and some few others will as naturally manifest themselves.

Secondly, favorable subjects above the foregoing age: Those of an indolent, slothful disposition, gross, fleshy, and who on slight exertions soon perspire; corpulent adults in health; those of a calm intrepid disposition of mind, who can look forward to the event without irritation and restlessness; those of coarse, rough, scaly skins; those who are frequently subject to eruptions and scabs, not of a malignant nature; those liable to glandular tumors, and such like cuticular obstructions; those who are naturally of a soluble habit; those whose digestive powers are strong; those whose labor is not excessive, and who are not frequently exposed to sudden heats and colds; those who being natives of a warm climate, but are lately removed from thence to a temperate one; and lastly, old subjects of good stamina. I do not rank in this class what are

called very regular temperate people of any age, on that account simply; because by experience I find such are as liable to be burthened with an abundant small-pox as the most irregular and intemperate: whether it be that they consider themselves as indubitably choice subjects, and therefore are more inclined to be remiss in the preparatory proceedings than others, who may have an indifferent opinion of themselves, I do not presume to say. The foregoing class of patients, compared with those which follow, are as about four to one.

By pointing out the class of subjects unfavorable for inoculation, I do not mean to alarm any person whatever, nor to throw needless difficulties in the way to that inoculation which it has ever been my zeal and happiness to promote and bring to perfection. But with many of such persons, I think it my duty candidly to observe, that especial care and skill are required, through every stage of the progress of infection, in order to ensure to them a mild and benign small-pox.

Under this unfavorable class, I consider the following individuals, whether they be in health
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or otherwise. And to begin with them in an infant state, I shall particularly mention those who have not had the thrush or red-gum; those naturally timid, who are apt to cry on trivial occasions. As to children who express a strong reluctance to inoculation, whether it arise from their being frightened by those about them or no, I know not, but I have generally observed that such children, nine out of ten, are disposed to a disease as froward as their tempers. I also consider as unfavorable, those who are naturally of a lean habit of body, or a dry parched skin; those of a costive habit, or whose stools are discoloured, from sucking very stale or impure milk, such as the milk of dram-drinkers, &c. &c. those, the future of whose heads not being properly closed in ordinary time, become enlarged, and perhaps hydrocephalous; those who are narrow chested, ricketty, or kept in a general state of sloth and uncleanness, or in a confined and corrupted air, or with too scrupulous an exactitude and sameness in food and exercise; those whose heads abound with a dark adhesive scurf, particularly about the temples; those, the skin of whose posteriors has, by uncleanness, become heated, hardened, or inflamed, and in some instances excoriated; for the

excrementitious evacuations of infants so neglected are exceedingly acrimonious; those who exhibit palpable signs of having worms; and lastly, children who are suspected to have caught the measles; because, should the cruptive fever from that malady intervene, betwixt the eruption and the crisis of the small-pox, some danger is to be feared, from a combination of the two diseases.*

Subjects unfavorable, farther advanced in life, are those of thin delicate habits, in their nature active, industrious, and vigilant to excess; those of a peevish, irritable, froward temper, or of acute susceptible feelings, from some peculiarity in the œconomy of the nervous system; those of a costive habit of body, with preternatural heat and dryness of the skin and hands, and whose sensible perspiration is with difficulty excited; those of weak digestion, subject to windy complaints, greasy or rancid sourness of the stomach, heart-burn, &c. those whose stomachs or other viscera are infested by worms, or labouring under intermittent, gouty and rheumatic complaints; those whose laborious occupation calls them daily before large fur-

* See Chap. IX. on the Morbillous Fever.

naces, &c. and thus frequently exposes them to heats and colds; sailors also, and others who have been long confined to salted unwholesome provisions; and lastly, those natives of a country, who being removed from extreme cold to a more temperate climate, are immediately inoculated, before a due seasoning has taken place.

Some subjects are obviously unsafe and improper to be inoculated, for various reasons. The following come under this description: infants whose heads are preternaturally large, or hydrocephalous; those persons who are afflicted with any acute diseases, or whose habits, injured by long and severe intemperance and irregularities, abound with acrimonious corrosive humours of the animal juices; those disposed to frequent returns of intermittent complaints, or to a manifest debility and languor of the whole system; those who have any painful internal obstructions, or are dropical; women in their latter months of pregnancy; hypochondriacal and hysterical persons, and those who are afflicted with the jaundice. Prudence directs a previous cure for such subjects, and to wait a favorable opportunity for introducing the small-pox, should it then be required and eligible.

CHAP. II.

Of Subjects most proper to supply the Matter for Inoculation—Time of Day, Season of the Year, and the best Age for the Operation.

HITHERTO people in general, and even the majority of inoculators, have confined their hopes of success, so far as concerns the choice of proper matter for inoculation, to the good natural state of health of the subject from whom the matter is to be collected; preferring a mild, benign sort, to a copious, malignant, ill-conditioned species: certainly no objection can be made to a healthy subject; such, for general satisfaction, is unquestionably to be preferred; and yet experience does not absolutely warrant this preference, for neither inveterate strumas, serophulous complaints, nor venereal taints, (the most of all others to be dreaded) have ever, to my knowledge, been communicated by the ordinary methods of inoculation; even in those cases, where experiments have avowedly been made in this way, for
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the exprefs purpose of afcertaining the extent of the effects of fuch matter.

But I have my objections to inoculate thofe, whom, upon examination, I rank under the clafs of unfavorable fubjects, from fuch as have a very benign fmall-pox, or from thofe whose arm indicates fuch benignity; and the reafon is, becaufe my experience has informed me (and it is neceffary to have had very great experience to afcertain the fact) that by fuch a choice, the fubjects to be inoculated are liable to have more of the difeafe than they would have experienced had they been inoculated from a malignant fource, or from thofe whose arms indicated fuch malignity. It is for the fame reafon that I ufually employ matter from an untoward flock, when it can conveniently be procured; but more efpecially when the fubject to be inoculated appears to fall under the clafs of unfavorable fubjects.

The time of day for performing the operation, though apparently trivial, is a matter well worthy our attention, if we are folicitous to lay hold of every little advantage as we pafs along.

Somebody

Somebody has well said, to our present purpose,

“ Despise not trifles, tho’ they small appear :

“ Sands rise to mountains, moments make the year ;

“ And trifles, life. Your time to trifles give,

“ Or you may die, before you learn to live.”

Should we refer to our reason for ascertaining the advantage, I believe it will be found in this, as in many other instances, not to be relied on, and very defective: but let us see what experience holds out as to the fact.

About ten or fifteen years after I had introduced and established the new method of inoculation, I was employed to inoculate a large party, of the same town, consisting of above 700 persons. About one half of them were inoculated before twelve o’clock, and the other half were begun upon, at half past three in the afternoon : They were all inoculated by my own hand, from the same individual subject, without any selection of persons for either part of the day. The constitution and temperament of the air on that day was uniform and serene throughout; the medicines were procured from the same druggist, and compounded by the same hand;

hand; and yet those persons who were inoculated in the latter part of the day, experienced, on an average of the whole number, five times the number of pustules that the others had, who were inoculated in the morning. Perceiving this singular difference in the number of pustules, together with the aggravated symptoms accompanying such increase, I was induced to search my records; from whence I could well recollect large parties having been inoculated in the latter part of the day, and other parties about the same season of the year in the morning. The result was, that I found, on calculation, the average number of pustules to be in about the same ratio as mentioned in the foregoing instance.

Should we be inclined to favour any particular season of the year, as being most propitious for the practice, or otherwise, I think we shall gain no advantage; I believe no one will be found preferable to an other; this at least is my fixed opinion, confirmed by unremitting observation and practice.

“What is the best age for inoculating?” has been a question put to me sometimes; to which I deemed

I deemed myself obliged to give a negative answer, by mentioning that which I think the worst; and this I believe to be, in general, from about eighteen to twenty-eight years, because I have observed patients of that age to suffer more from the eruptive symptoms, and generally speaking, to have the disease worse than at any earlier or later period of life.

CHAP. III.

Observations on the Use of fresh variolous Matter, and of that which is become dry or stale—Probable Occurrences—Unripe Matter, in some Instances, too active.

IT is not to be expected, though preferable, that crude fresh matter can always be obtained just when it is wanted: to supply the deficiency, therefore, recourse must be had to that which has been collected and dried upon a lancet or glass; and this will continue good many days: but when resorted to, it must be liquified with a drop of cold water, and then proceeded to

to inoculation, in the manner hereafter described. The smallest drop thus impregnated will be sufficient for the purpose. Some do not hesitate to use stale concocted matter; but it must be remembered, that neither this nor the dried, is to be depended upon for conveying the infection so certainly as the fresh; the progress of infection also, will not be so quick in general, nor will the indications on the arm be so favorable: the conglobate glands of the axilla will be more liable to suppurate; the eruptive symptoms more irregular and ungovernable; the disease, in short, more forward; and lastly, which is a circumstance the most extraordinary and unaccountable, neither the preparatory diet, nor the medicines, will be found afterwards to be so effectual, or to agree so well with the patient, as when fresh active matter has been employed.

To most patients, where it becomes necessary, a strict preparation, continued for only eight or ten days, during the progress of infection, is not very pleasing, and becomes really tedious and disgusting, when lengthened, by a sluggish infection to fifteen or twenty days; yet such instances do now and then happen from stale dried matter. But this would not be an object of
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very great consideration, did the evil rest here; for, by the use of such matter, the patient may, in all likelihood, have to encounter with a very copious small-pox, which he would not have to do from the use of fresh matter. Lastly, when once inoculation is determined on, and put in execution, failures in communicating the infection from bad matter are productive of great disappointments; they always derange and lengthen the preparatory proceedings; and while suspense hangs on the mind of the patient, if an adult, he may be kept in such a state of restlessness and irritation, from that cause alone, as may lead to very untoward accidents. Some patients there are, even at this day, who cannot be prevailed upon to persevere in a second or a farther trial in case of failure; and this from a superstitious persuasion, that the first abortive attempt was contrary to the will of Providence. This is very embarrassing, sometimes irremediable, and may in the event be dangerous.

I have hereafter stated the progress of infection as resulting, in some degree, from a certain accurate and uniform mode of performing the operation, together with the use of proper matter for communicating the disease. But if we
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are not attentive to this practice, and make large and deep punctures, so as to penetrate quite through the skin, the centre of the incision may in consequence appear afterwards more depressed than it otherwise would have been; and it will, in the course of infection, be more subject to slough and become foul; and the glands of the arm-pit more liable to be affected: so also a large and unnecessary quantity of matter employed for infecting, particularly at a time when the skin is in a humid state, may solicit pustules about the incision, even to a degree of confluency, which might not have happened had a small quantity been used and the skin dry: however, this confluency much oftener proceeds from a natural disposition to forwardness. The inflammation on the arm also will not be so extensive; and the halo or ring surrounding the puncture, during the eruptive symptoms, will be less frequent. And, if I can rely on my observations, the eruptive symptoms will be more refractory, and the small-pox more abundant from the use of stale dried matter, than from that which is fresh and active.

There is a possibility, I confess, that variolous matter, taken at the early stage I have recom-

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mended, may prove too active, by producing the febrile symptoms so soon, that we may not have a sufficient number of days at our command to prevent a disagreeable crop of pustules; for it is not always the case that a very favorable small-pox will follow an early progress of infection, though in ninety-nine cases out of one hundred it does, according to my practice.

These very active instances, which are chiefly confined to infants, arise from an uncommonly active disposition of body and mind. This coinciding with the use of crude matter taken from a subject whose case is, or is likely to turn out froward, the disease will be produced in two-thirds of the usual time, without imputing the casualty to a previous natural infection, or to any coincidental state of the air; which, from what I have said on that subject, cannot, I conceive, be the case.

CHAP. IV.

Ineffectual Insertions of Variolous Matter—Some Instances of them which led the Author to discover, by simply puncturing the Arm with a charged or clean Lancet, whether the Person applying had already passed through the Disease or not—The Effects produced on the Arm and Habit of such Persons as apply to be inoculated, but do not experience the Disease—Observations on such ineffectual Cases—The Method of performing the Operation, so as to decide upon them with moral Certainty.

IT sometimes happens that persons, unconscious of having had the small-pox, present themselves for inoculation; and they, no less than the operator, under such unforeseen and embarrassing circumstances, must be mutually disappointed in their expectations. Hence a second, a third, or even a fourth operation, has, from time to time, been insisted upon by one or the other, but with no better effect; and each, in this dissatisfied state, takes leave of the other.

An incident of this sort occurred to me soon after I had begun *the new method of inoculation in Essex*, in the person of a Mr. ——. I had inoculated him five or six times successively in the course of three weeks, during his stay at my house; he was also daily amongst the infected, but without experiencing any variolous effects from one or the other, such only excepted, as I have since found invariably to follow ineffectual insertions.

After his return home, being still dissatisfied, he took frequent occasions to visit my infected houses, still continuing to live by rule and to be inoculated, until at last he was fully convinced of his being proof against any variolous attack. Having so often punctured this patient's arm, at last I began, as I conceived, to discover an unusual density, or compactness, in the texture of his skin. In making the puncture rather deliberately, the skin seemed to cut firm, not receding from the lancet like that which is of a soft, loose, porous texture, and liable to imbibe the small-pox.

Whether this density or compact texture of my patient's skin was merely a casual formation, resulting

resulting from no particular accidental cause; or whether any useful information or certain indications might have been afterwards derived from it, I could not conjecture. The effects, however, produced from these repeated insertions were as follow.

In a few hours after the insertion of the small-pox matter, the part became considerably inflamed and hardened to the extent of a shilling; or wider, resembling the effects produced by the stings or bites of small venomous insects, and attended with an itching sensation. These effects increasing, continued for two, three, four, or more days, and then disappeared. In some instances of this sort which have since happened to me, the part thus irritated has suppurated, and a small sloughing ensued; but this matter will not give the small-pox. In others the inflammation has extended from the elbow nearly to the shoulder. In subjects of a plethoric, gross habit, the head and stomach, about the sixth or seventh day, have been a little disordered for a few hours, and in one or two of these ineffectual cases, a pain and stiffness of the axilla also have been experienced. All these symptoms and circumstances have, however, ended happily, and

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required

required little or no chirurgical or medical assistance.

Shortly after I had met with the first mentioned case, another of the same kind occurred; the first insertion proved ineffectual, and as the inflammation and itching of the incised part were in all respects nearly the same as in the instance of Mr. —, I began to have some doubts whether the event also would not be similar. To be as certain therefore as possible, I inoculated him a second and a third time, and this with a view also to ascertain whether the skin possessed the same dense kind of texture, and firmness in puncturing, as in the first case. To this end, I was particularly attentive to the cutting of the skin, and was pleased, both at the second and third operations, to find that it cut exactly in the same manner as in the case of Mr. —. Much the same appearances afterwards followed, and the event proved equally ineffectual.

I enquired of this person, as to the possibility of his having had the small-pox previous to his application to me; he recollected to have heard, when a child, his mother and grandmother debating

bating upon this subject; but as he had no marks of it on any part of his body, he entertained no idea as to the point of fact, until I told him my reasons for presuming that he must have had the small-pox before, or at least that he was not liable to take it in future. Strongly, however, inclining to think that this was an object of consequence, as some useful information might arise out of these casualties, I requested permission to puncture his arm a few times more in the manner I had already done, only with a lancet perfectly clean; for I now wished particularly to pay all possible attention to the puncturing of the skin, in hopes that my sense of feeling from the point of the lancet might be so well confirmed under similar circumstances, as with a moral certainty to determine in the first instance, and by simply puncturing the skin with a charged or clean lancet, whether a patient really had, or had not already passed through the disease.

My practice of inoculation, from year to year increasing, large parties, to the number of from one to six or seven hundred, were now and then inoculated in a day, and amongst these,

one, two, or three ineffectual cases, like the foregoing, would commonly occur. But, where such numbers were to undergo the operation in so short a space of time, it was not to be supposed, however generally nice in my observations, that I could pay sufficient attention to remark with precision, and to determine positively on every case, or indeed on any one in particular, at the instant. Yet, nevertheless, amidst all this dispatch, not one in five would escape immediate notice.

Further experience, in calmer practice, has at length matured the knowledge which I so much wished to obtain, and has brought it to that state of certainty which (I shall presently explain) will enable any person in private practice to judge of the effects on the instant, with the utmost accuracy, by simply puncturing the arm with a lancet perfectly clean. Should such practitioners, however, have any doubts at first as to their ability, by only performing the operation with a lancet charged with crude fluid matter, the effects produced from it will soon remove all uncertainty. Another circumstance also will considerably help to confirm their prognostications. The instant appearances of real infection,

infection, which are fully described in the ensuing chapter, will never occur.

Against what I have thus advanced it may be suggested, that some persons are not liable to the disease at some one time, or indeed at any time by inoculation. But I am by no means of this opinion; for upon a strict enquiry into three-fourths of these ineffectual cases, which have occurred to me through one medium of information or another, I have been enabled, with a satisfactory degree of evidence, to ascertain, that the persons so inoculated without effect, had taken the disease before. And for this reason, therefore, I conclude, that in all probability, the other part had also passed through the disease. Of late, indeed, I have never had occasion to perform the operation but once, being well convinced that if I failed in the first essay, all future attempts will be equally fruitless and in vain.

I have understood that many such ineffectual inoculations as before described, if they happened to be accompanied with inflammation, itching and pains in the head, cold shiverings, &c. have been determined upon otherwise, and
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the patients at the end of six or seven days have been returned to their relatives, or finally discharged, as having been conducted through the small-pox in that time. Such a conduct, I apprehend, must only have proceeded from ignorance. I admit that these ineffectual cases, sometimes are attended with the foregoing febrile symptoms, and slight remitting pains in the head and other parts; such symptoms also have been experienced by common nurse-tenders on the small-pox, and sometimes succeeded also by a sort of blind eruptions on their arms and faces, particularly when they attend on infants loaded with the small-pox. But we are not to contend, therefore, that such symptoms and eruptions are of the true variolous kind, although caused by it; nor that the matter of such blind pustules will ever convey the disease to another; nor yet, that some people are therefore susceptible of the small-pox repeatedly.

To ascertain by simple puncture, with a charged or clean lancet, whether or not a patient has already passed through the disease; let the practitioner carefully attend to the following method. Make the puncture rather deliberately, not deeper than the sixteenth part of an inch, and slant-wise, as usual. Should the

the skin thus punctured cut firm; somewhat resembling, for instance, the cutting of liver, lift up the skin a little with the lancet before it is returned, and observe whether that part of the skin just above the lancet looks paler than it usually does with those who are clearly susceptible of the small-pox. We may then safely pronounce that the subject has already passed through the disease. But as it may reasonably be presumed that none will apply for inoculation, who are conscious of having had the small-pox before, so the operation is generally performed with a charged lancet, and this being done, the appearances resulting from inefficacy will in course follow.

If by thus positively determining in all cases, whether people would have the small-pox or not, the experiment had no further extent or object, it might possibly be considered by many as rather a matter of curiosity than use: but this exertion of skill extends much further. Should the patient be informed on the instant of being inoculated, that he has already experienced the disease, it will give him the clue and a motive for enquiring among his relatives or others, as to the fact thus unexpectedly declared. It must either have, or at least ought to have such
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an effect on his mind as if he were instantly, by a kind of charm, carried through a loathsome and troublesome disease, without suffering fear, doubt, or pain, from the event of his inoculation. It precludes the necessity of using preparatory diet and medicines, and supercedes all their disagreeable consequences and effects. The work of safety and consolation is performed in an instant; the patient, if he so chuses, has the pleasing satisfaction of immediately returning home to his avocations and to his friends, and I should hope also without being at the expence for that which he has not received, because he did not want it.

I am aware however, that to acquire a competent knowledge of this art requires the occurrence of many ineffectual cases; the habit also of unremitting suspicion with regard to them; nice attention to them as they offer, and a good retentive critical degree of feeling, so as to determine every case with promptitude and accuracy. As to the effects that result from puncturing the skin, together with the concomitant phenomena, I have explained, I hope with sufficient precision, to leave not a doubt on the mind; at least where the case was before doubtful.

CHAP. V.

The Author's Manner of inoculating the Small-Pox.—Observations on the instantaneous visible Effects produced by the insertion of the variolous Matter when it proves effectual.

ON this subject little need be said, as the manner of performing the operation is now familiar to almost every one: however, a few observations upon it appear necessary, and may, in many instances, be found very useful.

The lancet being charged with the smallest perceivable quantity, (and the smaller the better) of unripe, crude, or watery matter, immediately introduce it by puncture, obliquely, between the scarf and true skin, barely sufficient to draw blood, and not deeper than the sixteenth part of an inch. Neither patting, nor daubing of the matter, in or over the punctured part, is at all necessary to its efficacy. This practice indeed is rather prejudicial than otherwise, as it may affect the form of the incision, and thus be apt to confound our judgment

judgment upon it. Make the puncture not more than two or three inches above the joint of the elbow, on the upper part of the arm of an adult; if on infants, not more than an inch above it. Should it be made higher up, inconveniencies may arise when in an inflamed state, the part is to be examined. In passing up a tight sleeve very high at such times, to come at the incision, the head may be rubbed off, and a considerable inflammation and sloughing may take place in consequence, creating unnecessary pain and trouble.

On the very instant that fresh variolous matter is introduced from the point of a lancet, a flushing or light inflammatory, tremulous appearance, of short duration, round the punctured part to the extent of an inch or farther, is discoverable; and on its disappearing, it leaves the skin for a while paler than in its natural state. This phenomenon appears only on those who are susceptible of infection, not on such as have passed the disease, nor in the same degree on all who are liable to be infected; on some few it is not discoverable without the help of a magnifier, from some supposed opacity, coarseness, or thickness of the cuticle, or from

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an unusual finallness of those filrous capillaries on the surface of the true skin.

On the insertion of the matter, the adjacent fluids, which appear to be almost pellucid, seem to be put in immediate commotion, rapidly dashing to and from the point of insertion, in all directions; and during this phenomenon, instantaneous pains are sometimes perceived in remote parts of the body. How far the nerves, the source of all sensibility on the skin, may operate with this secreted fluid, as an unsuccessful repellent of the variolous contagion, I know not; but it is certain, that the convulsive motion alluded to is not the result of the mere puncture, because when such is made with a perfect clean instrument, these effects are not produced either on a person who is susceptible of the disease, or on one who has passed it. It is submitted to the consideration of those better informed than myself, whether this rapid and clashing motion, seen at the instant of inoculation, does not also, in some measure, prove an organic circulation on the superficies of the body.

CHAP. VI.

Of Medicines and Diet; Cleanliness of Person; Exercise and Air; considered as anti-variolous Preparatives of general Use, from the Day of Inoculation to the Termination of the Eruptive Fever: with Observations on the Treatment of Patients thenceforward.

WE are here to shew in what way the preparatives, considered as an anti-variolous measure, are calculated to resist the violence of the disease. My object, therefore, in directing the following preparatives, is, first, to clear away all redundancies and indigestible impurities, in case any such should prevail in the first passages, thereby securing a regular and good digestion. Secondly, The diet being duly restricted in quantity and nutritious quality, the blood will naturally become properly attenuated; and being by this means deprived of its influence to induce or support an undue heat and irritation on the surface of the body, a mitigated disease will naturally be the result. The skin too, from this paucity of nutritious assistance,

ance, will, of course, be rendered cooler and more flexible, less liable to be affected by the fever; and the generative fecund power in the skin will also be proportionably less prolific; in consequence of all which, the eruption will be reduced to that certain and regular, that uniform and benign state so anxiously to be wished for, by all who are interested in the success of inoculation.

In aid of this lowering antiphlogistic method, the following purging powder, or some such like, (for it is in general immaterial in what it consists, so that the patient be properly purged) will be found to have its share in the success of lowering and cooling the habit,

The quantity of the purging powder for each patient's age will be found in the table of medicines subjoined.

Take of—Jalap, fresh powdered, two parts,
 ; Turkey rhubarb, in powder, one part,
 —Mix, and sign it—THE PURGING POWDER.
 This composition is calculated for children, but for those who can be prevailed upon to take them, glauber salts are preferable.

Or, take of—Syrup of buckthorn, an ounce and a half,

Stomachic tincture, a drachm and half. Mix, and sign this—THE PURGING SYRUP.

The following alterative powder has also its correspondent use with the foregoing, and its respective quantities will also be found in the table.

Take of—Calx of antimony washed, ten drachms,
Calomel, eight drachms,

Emetic tartar, two drachms.—Mix, and rub them well in a marble mortar, until they are perfectly united, and the composition smooth, not gritty. This powder should be kept in a wide-mouthed vial with a gauze covering only; and it will be found to answer the end better, should it stand for a month or six weeks before it be used.

Every patient proper for inoculation is enjoined the use of this mercurial composition: two motives induce me to this practice: first, That in conjunction with the other ingredients, it is exceedingly well calculated, in the way I shall direct it to be taken, to answer the intention of subduing any preternatural heat, which
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might, without the use of it, continue to subsist in the habit, and to remove from the first passages whatever might be prejudicial to the process. It also prepares and induces the habit to perspire during the eruptive symptoms, a circumstance very desirable.

Secondly, in case any obstructions, though imperceptible, should happen to exist in the skin, the mercurial part of the powder, by its gravity and power of entering the minutest vessels, will be found to have a most powerful, I had almost said a specific effect in destroying worms, should such have an habitation within the stomach, or other viscera. Lastly, when considered in what small quantities it is to be administered, and how short a time is necessary for its use, it cannot in any wise be deemed an unsafe or improper medicine.

The further object which I have in view, by directing a temporary use of medicines, is to secure a gentle, gradual, and proportionate reduction of each patient from day to day, previously to, and during the eruptive fever, according to the classification of the subject. In pointing out the good effects of gently reducing

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the inoculated subject, I must not be understood to mean, that the reduction of infants should extend further, than merely to prevent, for eight or ten days, their increasing in weight ; nor indeed, in many instances, are they to be kept even down to that standard ; because, during the first three or four months of infancy, the increase of bodily weight is more rapid than at any future period ; nor can it be conceived that I mean to be so exact as to require their being put into a pair of scales, in order statically to ascertain the point of reduction proposed.

In directing the quantity of the alterative powder to each age, and particularly to infants, my design is to proportion it rather to the extent of the skin, than to the comparative weight of the patient : my calculation being, that the superficies of an infant from three to four months old, is about the sixth part of that of an adult, although the weight may not be more than a sixteenth part ; and for this reason it is, that I order for such infants the sixth part, in general, of what is usually given to adults.

The following table exhibits at one view the quantity of those alterative and purging medicines,

cines, which is generally found necessary for each respective age, from one month to the extreme of life.

TABLE OF MEDICINES.

Years of Age, from		Alterative Powder. Number of Grains for a Dose.	Purging Powder. Number of Grains for a Dose.	Glauber Salts. The Quantity for a Dose.
17 to 70	take	12	30 or	one ounce.
16 — 17	—	11	25 or	seven drachms.
14 — 16	—	10	22 or	seven drachms.
12 — 14	—	9	22 or	six drachms.
10 — 12	—	8	20 or	six drachms.
8 — 10	—	7	18 or	five drachms.
6 — 8	—	6	18 or	half an ounce.
4 — 6	—	6	16 or	half an ounce.
3 — 4	—	5	14	N. B. Where the purging powder does not agree, or is not sufficiently productive of stools, 2, 3 or 4 tea-spoonfuls of the purging syrup, according to the age of the child, may be given in lieu thereof, or senna-tea may be used to quicken the powder, when necessary.
2 — 3	—	4	12	
1 — 2	—	3½	10	
MONTHS.				
8 to 12	—	3	9	
4 — 8	—	2½	9	
1 — 4	—	2	8	

My method, when I have inoculated a patient, is to leave with him ten of the above alterative powders, and five of the purging powders, inclosed in the printed instructions; the former to be taken, one every night at bed-time, till otherwise ordered, beginning on the evening of inoculation; and the latter, the purging powder, to be taken every morning, beginning the morning next after the operation; by which course they will be expended much about the same time, that is, on the tenth day from the insertion of the small-pox. I direct the alterative powder to be given in currant jelly, a vegetable acid, because it is necessary that a fermentation should be produced, to prevent any disagreeable effects, which the emetic tartar in the composition of the powder would otherwise be more liable to create.

The method of mixing and giving the alterative powder is as follows:—Half a tea-spoonful of currant jelly being spread in the front of a table-spoon, carefully slip one of the powders upon the jelly, and mixt them uniformly together; as they are mixing, a light fermentation or enlargement will be discernible; in this state the patient should swallow the dose; and particular

cular care having been taken not to waste any of it, nor to leave any in the spoon untaken; it should be washed down with a spoonful or two of any warm simple liquid. The patient having taken the medicine, should immediately retire to bed, otherwise it may not rest quietly on the stomach. Should any part of the medicine have been wasted in mixing or giving it; take so much as may be supposed to have been lost, and proceed as at first. This alterative powder must not be mixed in any liquor, but with the jelly only, for the reasons before given.

It is not unusual for the first, and sometimes the second alterative powder, to cause a slight sickness and vomiting, especially if the stomach abounds with flatulencies, or indigestible crudities; and under such circumstances, it is rather fortunate, that the medicine should have disburdened the stomach of its unwelcome contents. After the use, however, of the first or second powder, it seldom has this effect; neither ought it to have any sensible effect, unless to cause a laxative motion towards morning, until the onset of the eruptive fever; when, during this effort of nature, it may be expected, in the night season, to produce a sensible perspiration.

This is indeed an object peculiarly desirable, as from henceforward the alterative powders become useless.

The purging powders are to be given in a spoonful or two of coffee, in preference to any other vehicle, and sweetened to the palate. Their operation should extend to four, five or six loose stools, as the case may require; that is to say, should the subject be of the favorable class for inoculation, and the progress of infection on the incision, prognosticate a favorable event, four loose motions may be sufficient to be obtained from each dose. On the other hand, should the indications both before and after the insertion of the infection, turn out untoward, as will be known by the description I have given of the progress of infection on the arm, five or six motions will be necessary to be procured at each time of administering a purging powder, particularly that powder which it may be expedient to give at the commencement of the eruptive fever, or during its progress.

The purging powders should be worked off either with water-gruel, rennet-whey, or weak fenna-tea, as may be most agreeable and convenient,

nient, for the purpose of obtaining the requisite number of motions. Where the digestive powers are naturally weak, or rendered so by casualty, or where the stomach and bowels abound with acidities, flatulencies, or worms, the purging powders will sometimes take their course upwards, and defeat the purgative intention. In all such cases, when the sickness is gone off, the whole, or a due part of another powder must be given; or recourse may be had to some other laxative, so as to procure the necessary number of stools in the course of the day.

To those *above five years old*, glauber salts may be given, dissolved in a little warm water, and worked off in the foregoing manner. I think salts preferable, in general, to any other purging medicine, from their possessing a more cooling quality; but infants can very seldom, if ever, be prevailed upon to take them.

In directing the preparatory diet for the patient, my design is, that it should correspond to the same ends and intentions as are aimed at by the alterative and purging medicines, namely, to reduce the habit, and to prevent any improper heat or irritation, after the local variolous
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increase has taken place. Having already considered the subjects for inoculation, under the two heads of favorable and unfavorable, I now consequently advise and recommend it for the first class, that they should be daily restricted, in the following manner, to a *vegetable diet*, that is, three parts only in four of their former quantity of eating at each meal; and for the latter, the unfavorable class, I would have it lessened to two thirds. This difference in the quantity is but very trifling, yet such as I deem sufficient to answer a general reducing purpose. The patients thus dieted, should refrain from eating any thing between meals, unless it be fruits, prepared or in their natural state.

What has hitherto been advanced for the reduction of the patient by a restricted diet, must be considered as perfectly safe and proper, under each class of indications, without having much regard to the constitution of this or that subject; for amongst tender, delicate and weakly patients, we may often experience as great a proportion of unfavorable indications and forward eases, as amongst the strong and robust. There is indeed no clue, in these respects, to
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form our prognostications with any tolerable accuracy.

By pursuing our measures, according to the indications as they offer, we shall invariably find that such subjects as require the strictest treatment sustain it the best; and by adhering closely to the method proposed, we shall secure a favorable small-pox, uniformly, on each and every subject, how different soever they may be in age, sex, and constitution. Nor is there any danger to be apprehended, as some have supposed; of their being reduced too low to throw out the small-pox, or that their health and strength will not return together with that change of diet, which an emancipation from the disease will justify.

I understand it has been a practice of late, to give up preparation, medicinal and dietetic, entirely, and to rely on the power of medicines, and the skill of the operator, during the eruptive fever, to keep it in due subjection. But with submission to those who choose to practise in this way, I conceive, that one, at least, in eight or ten cases, may give them more trouble than is either desirable or prudent: and we
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have moreover reason to lament, that out of that number, in the natural way, one usually dies, from confluent small-pox, in defiance of our utmost efforts to subdue the eruptive fever. With equal submission also, I apprehend, that under such a mode of treatment, very little difference will be found between those who are inoculated, and those who receive the infection in the natural way. I never yet could discover any advantage from the mere act of inoculation, beyond that of ascertaining the time when the patient would fall ill. In short, I had much rather prevent than contend with unruly febrile symptoms to conduct my patients to a state of safety.

THE PREPARATORY DIET *is to consist of any of the following articles, best suited to the respective age of the patient.*

For Breakfast—Tea, with dry toast; milk-porridge; skimmed milk; rice-milk; panada; water-gruel; water-pap; honey and bread; or bread made with the addition of sugar and currants.

For

For Dinner—Bread-pudding; rice or millet-pudding; plum or plain pudding; apple-pudding; panada; milk-porridge; rice-milk, and the productions of the kitchen-garden. Sugar, salt, and vinegar, are allowed with the foregoing articles, as they may be desired.

For Supper—Any of the above spoon-meats; roasted apples or potatoes. For children, a little weak tea, or milk and water, with dry toast, at an early hour (tea-time) is all that is requisite.

As very little alteration can be made in the quality of the food for very young children, it will, on this account, be the more necessary to render that which they are allowed, rather thinner than before the operation, and to give it in a restricted quantity. Children at the breast may be stinted also in their allowances; their nurses, however, need only abstain from high-seasoned, inflammatory food, and spirituous liquors; and to keep their minds easy as to the event; for should they, from any imaginary cause, be kept in continual anxiety or agitation of spirits, their milk will of consequence become vitiated and unwholesome.

It is a very pernicious practice to put newborn infants to breasts, the milk of which is much older than themselves, and it ought to be avoided, if possible; such food being generally productive of costiveness, flatulency, and green griping stools, preternatural heat, and irritation of the skin; all which certainly tend more to increase, than to mitigate the eruptive symptoms. It is likewise necessary for all patients to persevere in their preparatory diet, until the eruptive symptoms are terminated, and the incision past the crisis; because any premature indulgence in nutritious animal food, or in strong drinks, just before, or during the eruptive fever, may raise it to an ungovernable height, and produce a dangerous crop of pustules, should there be a natural tendency to it.

The preparatory diet may safely be discontinued, when the stiffness and pain in the armpit have subsided; when the inflammation round the incision is gone off; when the matter contained under the vesication of the incision appears in plenty, and looks of a concocted, yellowish hue; the eruptive fever being subsided, the pustules having made their appearance, and the appetite revived, calls for a more nourishing supply.

supply. The change of diet ought, however, to be gradual and moderate, and especially where the pustules are numerous, or unusually large.

The same cooling *regimen* should be adhered to also throughout the progress of infection, in the article of the patient's drink, whether considered as a beverage, or as a diluent: therefore, during this stage, I advise the following, for common drink:

Toast and water; thin milk and water; barley-water; lemonade; boiling water, acidulated with cream of tartar in powder, and sweetened to the taste. The first and last articles are an excellent draught in the eruptive fever; and a very liberal use of either is highly necessary and refreshing when the fever is excessive. The small-pox having made its appearance a few days, the restriction of drink may be taken off, and the patient may be indulged with a moderate quantity of his usual beverage.

The following articles of diet are not allowable during preparation.

Of

Of Eatables—Fish, flesh, butter, cheese, eggs, and spiced food. Of Drinks—All spirituous and vinous liquors, cyder, and beer of any sort. In short, whatever of either kind possesses a manifest heating quality, must be avoided as very improper, during the progress of infection and the prevalence of the eruptive fever; particularly should the fever be accompanied with sickness of the stomach, or a loathing of food. In such cases, an obstruction on the stomach of very nutritious or heating things may be attended with dangerous consequences; nor should they ever be given for that silly idea of throwing out the small pox. Too great a load indeed may be expected, in these instances, without such wretched aids.

On the head of cleanliness of person as a preparative, one would reasonably suppose that little need be urged; as not a creature can hardly fail to own the utility, from the drawing-room to the nursery; and yet so it happens, that poor nature too often seriously suffers from the want of it in the latter region, where most especially it claims the strictest attention. From an unaccountable and injurious habit of unnecessary cloathing, swaddling, and pinning up of infants,

infants, how frequently do we observe their delicate skins tortured with a fixed heat and inflammation on certain parts, extending even to excoriation! This, and the consequent uncleanness that naturally follows such treatment, are the frequent cause of an insufferable load of small-pox on such places, at the same time that other parts of the body shall be found almost exempt from the disease. Whether it arises from a deprivation of cool refreshing air, or whatever else be the cause, it is certain that the excrements of infants thus ill-managed are exceedingly foetid, acrimonious, and irritating, such ought, therefore, to be removed as soon as discovered, and the parts washed clean with cold or warm water; and this with safety may be done at any stage of the disease. A continued series of uncleanly management in the nursery, may convert a naturally good subject for inoculation into a very unfavorable one; and we may be necessitated to persevere in a preparatory treatment with some severity, which otherwise would have been unnecessary, in order to counteract such injurious proceedings. The heads of young children should also be kept perfectly clean, and free from scurf; this adhesive soil not being natural to infants in health, may proceed

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from some general defect in the organs of perspiration; for whenever an obstruction of this sort is prevalent, the heads of infants will generally be found incrusted with this black adhesive soil, particularly on the temples; their habit of body will be found thin, their skin flaccid, and of an unhealthy colour: and hence it is, that I have assigned them a place in my classification of unfavorable subjects.

Moderate and frequent exercise, in temperate air, such as is customary, but not to excess, during the preparatory stage of inoculation, is conducive to a variety of useful purposes. It gives keenness to the appetite, invigorates the digestive powers, promotes a due degree of insensible perspiration, and enables the whole organic system to throw off all such impurities as might otherwise adhere to the skin. Infants in hand, by way of exercise, should have their bodies and limbs frequently well rubbed with the hand; and if they have been in the habit of cold-bathing, that practice may safely be continued till the small-pox has made its appearance; indeed I see no reason why it may not be continued throughout the disease, where the subject inoculated has been in the habit of bathing, and

is in a relaxed, debilitated state, or afflicted with the rickets. All indulgence, or confinement rather to the cradle, beyond what is necessary for sleep only, retards the progress of infection, and inclines the distemper to a greater degree of forwardness.

It has been insisted upon by some persons, that much of my success in inoculation was obtained by forcing my patients into uncustomary and very cold air, during the eruptive fever. I have never yet aimed at the gigantic power of restraining the tongue of unthinking ignorance: but for my own credit, at least, it is but just to say, that the assertion so hazarded against me, is not founded in fact. Having had other, and more effectual resources for moderating the fever, I have never wished to expose my patients to a greater degree of cold air than was perfectly agreeable to them, and consistent with their former practice, however the indications and the fever might present themselves to my own judgment.

CHAP. VII.

Of the various Appearances of the incised Part in its daily Progress of Infection; and the favorable and unfavorable Indications pointed out, on certain specific Days of examining the Patient, from the immediate Insertion of the variolous Matter to the Crisis or Maturity of the Incision.

IN describing the following indications and appearances of the incision, it must be understood that the insertion has been invariably performed in the manner already detailed; for as these appearances and indications will be found, by experience, to depend much on the mode of performing the operation, so it will be necessary that it should be well attended to, as by this invariable mode of practice the succession of appearances and indications may be expected more regularly and uniformly to precede each particular degree and species of the small-pox, so far at least as such appearances and indications are either attached to the mode of practice, or depend upon natural and constitutional causes;

causes; nor will our judgment be so apt to be confounded as otherwise it might be.

Indications of the Incision, &c.

In the incipient state of variolous increase in the incision, a small florid spot appears on the part of access, resembling a flea-bite in size; and on passing the finger lightly over it, a hardness is felt, not larger than a small pin's head. This florid appearance and hardness denote that the variolous principle is effectually imbibed, and their indications point no farther, unless the progress to vesication be very slow, in which case an uncomfortable number of pustules may be suspected to follow. The florid spot, in most instances of inoculation, is somewhat larger, or more extended, on the second than on the third day after the insertion,

Itching of the Incision, &c.

About the fourth day from inoculation, should the incision begin to vesicate, an itching sensation will be complained of, on the place of insertion; the occurrence of which symptom is the first indication of a favorable event, yet not of sufficient importance to justify any present relaxation in the preparatory proceedings. The operator should be very careful not to confound

the itching sensation here noticed, with that which occurs much earlier, and before the vesication is seen to take place, and where it is an indication of inefficacy.

In this early progress of variolous increase, nothing further is discoverable to our present purpose; I shall therefore proceed to the next stage of infection, but shall first premise, for the sake of perspicuity, that in describing the future indications and appearances of the incision, and other prognostics, I shall refer them to two classes, namely, favorable and unfavorable. To draw a middle line, with regard to such indications as generally precede what may be thought a troublesome crop of pustules, though by no means dangerous, would be an unnecessary and useless distinction, rather tending to puzzle and perplex, than to direct and benefit the operator.

Favorable Indications on the 5th Day.

The vesication of the incision, in most instances, will begin to be visible on the fourth or fifth day after the insertion of the matter; the sooner it becomes so, the more favorable may be expected to be the event. The extent, or diameter of the vesication, at this stage, does
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not usually exceed that of a large pin's head, and it has invariably a dint or small depression, in a greater or less degree in its centre, (a true variolous character) and the cuticle being a little raised above the surface of the surrounding skin, it will, on puncturing, be found to contain a very small portion of clear fluid, which possesses a variolous energy, fully sufficient for the purposes of inoculation. When the vesication takes place early, it will sometimes be accompanied with an itching sensation, and if, in consequence thereof, the head or table of the incision, a day or two after, shall be found to be rubbed off, a brown scab will be formed: this circumstance does not impede the progress of infection, on the contrary, it implies a successful infection. In consequence of this accident, and the part being rubbed and chafed, from time to time; an irritation, or inflammation and sloughing may follow: all which, however, being of little importance, will terminate to our wishes at the ordinary time, provided an unreasonable officiousness, by poulticing, &c. does not intervene. This trifling casualty may, however, sometimes occasion many pustules to be produced within the limits of the inflammation, although few or none may be found afterwards

on other parts of the body. A redness also may about this time begin to proceed from the base of the incision.

Unfavorable Indications on the 5th Day.

There are but two of this tendency discoverable on the place of insertion at this time; the redness and hardness of the incision not being increased since the first examination, and the incision not yet beginning to vesicate.

Favorable Indications on the 7th Day.

About this stage of infection, the vesicle will be found, on examination, to be extended to about the size of the flat part of a small split pea; its elevation will be proportionably increased, and the dint on its centre will consequently appear deeper; the raised covering of the more outward part of the vesicle, which is beginning to appear turgid, or bloated with variolous lymph, will have a smooth surface; devoid of asperities; and compared with other coverings, which contain a less quantity of lymph at this stage, it will incline to a bright transparency; and on puncturing the vesicle or bleb, its contents will flow out freely, without a pressure of the lancet. A redness, or crimson-coloured

loured inflammation, begins about the fifth or sixth day to be sensibly enlarging, and spreading forth from the base, or outward margin of the vesicle. Its progress from thence at first is rather sluggish, but as it advances to this stage of infection it will become quicker. To judge with accuracy of the various shades of the inflammation on different patients, a comparative regard must always be had to the natural complexion of the skin of the subjects inoculated.

The inflammation on the arms of some, may be simple, and unaccompanied with pustules; on those of others, it may be sprinkled with a few, and on others with a vast number, even to a degree of confluency. Whenever pustules so occur, in any number, their appearances ought to be late in the progress of vesication.

In consequence of an absorption of the variolous principle into the habit, the glands of the axilla, about the fifth, sixth, or seventh day, seldom later, will, in some instances, begin to be affected by stiffness and pain, especially on lifting the arm in an angular position towards the head; and on examination, the gland will be found to be enlarged to the size of a pea, in a fluctuating,

fluctuating, unfixed state. In the case of infants, who cannot express their sensation of these symptoms, the operator, to be fully informed of the state of the glands, should lift up the arm in a horizontal bended position, and examine with his two fingers, whether he can discover the glands to be enlarged. Their present magnitude is generally about the size of a pea, and they are not very painful when touched by the finger.

A supervening rash, somewhat resembling a confluent small-pox, except not being raised above the surface of the skin, is casually seen about this stage on different parts of the body, in patches of various forms and sizes; indeed, in some rare instances, it almost covers the whole body. Lastly, the habit of body, at this time is found inclining to a solubility, or is easily induced to perspire; all these are favorable prognostics, but they seldom all appear on one and the same subject.

Unfavorable Indications on the 7th Day.

On or about the seventh day from the insertion, the head or table of the incision may not have begun to vesicate, or it may have made
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but little progress. If a dinting has taken place, it will be small and very confined, and the general surface tending rather to flatness or depression, and scarcely rising above the surface of the surrounding skin, which will appear rather paler than in its natural state. The complexion of the table of the incision will be inclining to a dusky crimson, or purplish colour; and the cuticle, on puncturing it with a lancet, will be found thicker than when the incision is replete with lymph, which, from its paucity, is, with difficulty to be obtained by scraping, or pressure. The redness about the incision, (for it cannot yet be called an inflammation) makes but very slow progress, scarcely perceptible; and what is to be seen of it inclines to a dusky crimson colour. Pustules too are discovered within the limits of the inflammation at this early stage of it, and whilst the incision itself continues in a backward state.

Although convulsion fits are not now to be expected, yet as the following appearances on the table of the incision indicating them may begin to take place about this time, it will be most proper to consider them here.

Indications

Indications of Convulsions.

About the seventh day from the insertion to the attack, the vesicated part being, as before related, depressed, containing but a small portion of lymph, with its outward edge sharpish and irregular, and a considerable number of small points being seen, toward the extremity of the vesicle, resembling very small pin-holes, and of the colour of thin milk and water, little doubt remains but that the patient will be attacked with convulsions in the evening preceding the commencement of the eruption, unless seasonably prevented.

From the seventh to the ninth day inclusive is a period in the progress of infection the most important. No ignorance or inattention to what is passing on the arm, &c. must now be suffered: on the contrary, a just and accurate discrimination between the favorable and unfavourable indications, in what way soever they now present themselves, is absolutely indispensable, in order to insure an uniform and favorable small-pox. And here it must be recollected, as I have observed elsewhere, that many of the indications depending on the mode of practice, are subject

to variation ; and will either recede or advance accordingly. Thus an unfavorable indication, which depends on natural habit, may be converted, by practice, into a favorable indication ; and by the neglect of a due preparatory course, it may continue equally unfavorable to the end.

Favorable Indications on the 9th Day.

On or about the ninth day from the insertion the incision will be either apparently more turgid and dinted ; or it may in very early cases, even before this stage, have lost its dint entirely, and the head in this case will be of a globular form, in the shape of a large plump poek ; whilst in others, the dint continuing, it may be considerably increased in its elevation and extent, of course a greater and proportionate quantity of lymph will be contained within it. On puncturing the incision, the flowing lymph (in very early instances, and where the fever, although hardly perceptible, has made some progress) will appear very lightly turbid : In this state of the lymph, the inflammation being considerably extended from the incision, the outermost part of the inflammation will be of a deeper cast than that which is nearer to the puncture, and in some cases, though not in all, the inflammation will form
a ring,

a ring, or halo, the intermediate space inclining to a pale orange colour. The outer part of the surface of the vesicle at this period continues smooth, and will have acquired a somewhat more shining appearance than heretofore.

The inflammation about the incision, which is still inclining to a deep crimson hue, will be spreading fast; the pustules, few or many, within its limits, will have arrived at a state of vesication; and in very early cases of progressive infection, they may already have lost their dint.

The stiffness and pain in the axilla, or arm-pit, before noticed, will, under the state of these appearances, be on the decline, and the glands lessening. The febrile symptoms, scarcely discoverable hitherto, will in most cases be found to have made some progress. Early on the eighth, ninth, or tenth morning, the patient on enquiry will have experienced a degree of perspiration; and if of a sufficient age, he will complain of slight remitting pains on the fore part of the head, especially in turning the eyes upwards, which he may be directed to do.

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A casual efflorescence or rash, generally the effect of a medicinal preparatory process, and otherwise but little connected with the small-pox, may, perhaps, now be expected to make its appearance, as before related : the later it appears before the eruptive symptoms take place, the better. A slight fever usually precedes it.

Another kind of efflorescence also, unquestionably a-kin to the rash, and in consequence of medical preparation, is about this time seen to make its sudden and unexpected appearance round the incision to a considerable extent. Its progress is very rapid ; it usually comes on in the night, and by the morning it will be extended to the breadth of a half-crown piece, or much further : it generally continues increasing in colour and size, till the crisis of the eruptive fever ; sometimes nearly till that of the incision ; and is always attended with a halo, or ring, in its decline.

My reason for believing that this efflorescence, like that of the rash, occurs chiefly in consequence of a medicinal process, is this, that where such process has not been insisted upon, or persevered in with steadiness, and where the disposition

fiction of habit does not coincide, these appearances are seldom or never observed; nor are they ever the forerunners of a copious or ill-conditioned small pox.

A pain across the temples, especially on turning the eyes upwards, is also complained of by some patients in this stage of the disease. It may continue twenty-four hours or more, and then ceases.

Lastly, during a perceptible eruptive fever, the appetite continues unabated, with a relish for diluting liquors.

Unfavorable Indications on the 9th Day.

On or about the ninth day from the insertion, the vesication will probably have taken place; but it will rise and fill with lymph very slowly; and, instead of a visible dint, a general flatness or depression may sensibly prevail over the whole surface of the incision; the external form of which, approaching its extremities, will be uneven; its edges sharp, and irregularly jagged; and in passing the finger over it, will appear, in some instances, to be rather below than above the surface of the surrounding

surrounding skin. In this case, the cuticle, on puncturing, will still appear thicker than ordinary; and the clear lymph underneath, from the smallness of the quantity collected, will, with difficulty, even now be obtained.

The incision, in some rare instances about this period, or rather later, will be very broad, exceeding the circumference of a sixpenny piece, in some instances as broad as a shilling; and yet, although thus extended, if it does not contain a corresponding quantity of lymph, and the parts about it be but little inflamed, and a paleness, rather of an orange-coloured cast, prevail at the extremities of the inflammation, the appearances, especially the last, portend great and uncommon danger.

The general complexion of the incision may be found still inclining to a dusky crimson colour, but mostly so in the centre. In some instances also the centre will appear of a livid bluish cast, and in others of a brown, although the head of the incision has not been rubbed off.

The inflammation surrounding the incision, even at this period, makes but very slow progress; and although it may be extended on some arms more than on others, yet it seldom is found to spread beyond the circumference of a shilling.

The pustules within the surrounding inflammation, whether few or many, appearing early in the vesicated state of the incision, and like that too, vesicating but slowly. The fever continuing beyond the second night, before the pustules within the inflammation, be much raised or dinted. The spontaneous crop of pustules appearing either before, or in an early stage of the fever.

The variolous fever having made its attack, while the incision is in a watery, crude, or early state of vesication; or before the pustules about the incision (should there be any) shall have began to vesicate; or, before the inflammation at the base of the incision is perceived to have made a sudden rapid progress from thence: or, when a pain of the head is not particularly felt over the temples more than any other part of the head; or, when the fever is
accompanied

accompanied with restlessness, languor, loss of appetite, and the patient has a disinclination to take food; or, if the fever be attended with sickness and retching, accompanied by a hot dry skin, and the feet and ancles remarkably cold: Lastly, a preternatural fixed redness on one, or both cheeks, when the fever is not otherwise very sensibly experienced.

After this stage of unfavourable indications, I confess myself somewhat at a loss to describe those which may follow. For on searching my records of cases, I find but three or four in more than two thousand of my last inoculated patients to whom I have referred, who claimed any serious attention: my late and present method of practice preventing the further progress of unfavourable indications after this stage of the disease; most of them being, by the eleventh or twelfth day, changed into a set of favorable indications, when a correspondent eruption takes place in course. What I know by my own experience, and what I have obtained from that of other practitioners, will be found under the following head of unfavourable indications, on the eleventh day from the insertion.

Favorable Indications on the 11th Day.

On or about the eleventh day, in rather sluggish instances (which, however, are not always unfavorable) the contents of the incision will be clear and transparent, and the surrounding inflammation may not yet be arrived at its utmost extent, which last circumstance is ascertained by the extreme parts of the inflammation being of a stronger colour than that nearer to the incision ; nor will the pustules within the inflammation appear much raised, and vesicated to correspond with the inflammation. In short, the general crisis of the arm may not yet take place for a day or two ; but whenever it does happen, it may be known by the receding of the inflammation, by the lymph in the vesicle appearing discoloured, and by the total absence of the fever, together with a return of appetite, should that have failed. These are certain indications that a cook is more wished for, and wanted, than a Doctor.

In most instances the fever is scarcely perceptible, nor is the sleep and appetite very little, or at all interrupted or deranged ; but in cases of
rather

rather more sensible attacks, the fever may be experienced for three successive nights, though scarcely ever on the fourth, with intermission during the intermediate days; the second or third evening it usually makes its greatest effort; and retiring towards the morning, leaves the patient in a gentle perspiration.

Where the patient is liable to two or three hundred pustules, which will not be the case in so many instances; some small number of them usually begin to appear in the morning after the second night of the fever; the main crop in the morning after the third night; and some remaining few eruptions may not appear until the fever has entirely gone off a day or two: And thus the whole business respecting medical assistance terminate when the indications have been regularly favorable.

Unfavorable Indications on the 11th Day.

On or about the eleventh day from the insertion, and during the eruptive fever; the incision will still continue depressed and flat, and of a livid or brown hue; its edges jagged and sharp; the whole appearances remaining, to come to a

crisis even after the fever is declining or remitting. Infants, during the fever, expressing a dislike to be moved; frequently turning their eyes upwards; an incessant crying for hours together during the febrile symptoms; their lower extremities pale and cold to excess; the fever still intense, and unremitting, accompanied with sickness and frequent vomiting; pains across the loins; an intense pain of the back part of the head, felt particularly at the lower extremity of the sagittal suture, or upper part of the nape of the neck. This pain, when plainly manifested, seldom extends to the breadth of a shilling, and is a prognostication the most unpromising at this stage of any that I know, whether by inoculation or in the natural way.

Upon the whole, the later, the more irregular and complicated these appearances of the incision are found to be, so much the more obstinate will be the febrile symptoms, and the more forward and dangerous will be the disease.

Two distinct Crops of Pustules.

The indications of which are, a few scattered pustules unexpectedly appearing on the arms, neck, or other parts of the body, about the sixth, seventh,

seventh, or eighth day from the insertion, while the general appearances of the arm are in a crude state, and before the incision has arrived at the usual stage of maturity to induce us to look for pustules on such parts, and some hours also previous to the fever. The feet and ancles about the ninth or tenth day, during the prevalence of a severe fever, will on some subjects be found remarkably cold; these are the striking indications of two distinct crops of pustules.

It is to be observed that these pustules which precede the fever are seldom numerous, but they will generally be found much larger than those which succeed it; and although there is ordinarily an intervening space of two or three days, between the first and second crop, yet, as the last is usually of a very small kind, they generally come to a crisis about the same time with the other; the last, indeed sometimes, sooner than the first crop.

Two or three of the foregoing instances have occurred to me in the course of practice; and one of them very lately, where the latter crop of pustules came to a complete crisis within forty-eight hours from its first appearance. These

rare cases are generally very troublesome and embarrassing, but they have nevertheless ended successfully.

To the inexperienced, this early appearance of pustules may be very flattering; (as it formerly was to me) as it may give hopes that the febrile complaints, in consequence of the appearance of these scattered pustules, are on the decline, when in fact they have not yet commenced; we shall, therefore, act prudently by not relaxing in our preparatory proceedings, when such premature pustules, or first crop, make their appearance, lest we should be led on to a dangerous precipice.

CHAP. VIII.

Of the Examination of inoculated Patients, and of the medical Advice given on each Day of Examination during the Progress of Infection, the eruptive Fever, &c.

THE patient having been inoculated in the manner already described, and a general printed form of instructions for his conduct, inclosing

closing the usual quantity of the alterative and purging medicines, being delivered to him, I shall now proceed to the FIRST EXAMINATION; which with me, usually takes place on the third day from the insertion of the variolous matter.

At this time, in passing the finger lightly over the punctured part, a hardness about the size of a pin's head will be felt, and a small red spot will be seen, not larger than a flea-bite.

On enquiry into the effect of the two alterative powders which have already been taken, and whether they have been taken according to their printed form of instructions, we shall be informed that the first may, or may not have had a slight effect upwards; if it has, we should learn how long it has rested on the stomach before the sickness came on; the general time being from the first to the second hour: but if it was instantly thrown up, orders should be given in this and in any future occurrence of the kind, for immediate recourse to another alterative powder; since no great or proper effects can be expected from a medicine instantly returned; this circumstance seldom occurs, yet ought to be noticed whenever it takes place. The second
alterative

alterative powder will most probably have no sensible effect; neither should any of them afterwards, unless it be a laxative motion towards morning; a circumstance not very frequent, although rather desirable.

Enquiry should also be made into the effects of the purgative powder; and the number of laxative motions obtained from it should be remembered, and noted down in the proper column, on the back part of the instructions*. The number of motions to be obtained from each purging dose should correspond with the class in which the patient has been ranked; that is to say, if of the favorable class, four or five; but if of the unfavorable class, five or six loose stools ought to be obtained. In case the second purging powder, which is to be taken on the fourth morning, or if any future purging dose should prove too weak, special instructions must be given to have it assisted with a tea-spoonful or two of the purging syrup, or it may be worked off with fenna-tea, &c. as the case shall require. The patient being directed to continue the alterative powders and purging powder for

* See the printed form at the end of this Work.

two days more, according to his instructions, leave may be taken until the second examination. But before I proceed to further enquiries, or to give directions for the conduct of a patient from this to the seventh day, or third of examination, it may be necessary here to remark, that

Many of the original indications of an unfavorable kind, depending possibly on some slight defect in the digestive powers, are removable, by the use of the combined preparatives, in three or four days; and then the indications on the arm will begin to shew themselves favorably. In such instances, we are not to conclude that our first prognostications were erroneous, but may rather impute the favorable appearances now exhibited on the incision, to the happy effects of the medicines and diet, as acting separately or conjointly to this end. Other original unfavorable indications there are, more radical or stubborn, which may not so readily yield to treatment; some not till the seventh, eighth, or ninth, others not before the tenth or eleventh day; and in some very obstinate, untractable instances, not until a yet later period. I do not from hence mean to insinuate, that all
froward

untoward appearances will at length turn out benign, though in many cases more generally so, than otherwise; but it is good to be guarded against the consequences of a sluggish progress of infection, by reminding the parties so materially concerned, of the necessity of persevering in a strict preparatory course, until the febrile symptoms wholly disappear, and the contents of the incision is shewing signs of approaching maturity. Such perseverance, I am persuaded, if conducted with spirit and attention, will so meliorate and reduce the most untoward indications, as finally to bring a patient through the disease with all desirable success.

Second Examination.

On the fifth day from the insertion, &c. let the progress of infection on the arm be as it may, no alteration should be made either in the patient's diet or medicines, provided the latter have had their due effect: however, note down on the back of the directions, under the proper head, whether the incision be in a vesicated state, or otherwise, and whether it appears harder to the touch than when it was last examined; enquire also into the effects of the medicines, whether the purging powder has produced

duced the requisite number of motions; if it has proved defective, recommend better attention in future; and lastly, whether the alterative powder has had any sensible effect; if it has, and if a sucking infant be the subject of attention, give directions that the powder may not be taken on a full stomach, of which nurses and parents are often guilty; make all these necessary remarks on the paper. This precaution will have its use, when we arrive at the approach of the eruptive fever; for by glancing the eye over the progress of the incision as noted down, and the operation of the alterative and purging medicines, from time to time, we shall be the better enabled to advise what then is best to be done for the mitigation of the febrile symptoms. From this cautious expedient, it may be discovered, without further enquiry, wherein we have been defective, or otherwise, with regard to the effects of the medicines; we shall there see the daily progress which the incision has made, and from thence we may be better prepared against accidents. This method may by some indeed be esteemed a matter of no importance, but in my own practice I have frequently experienced its use.

Third

Third Examination,

On the seventh day from the insertion. We are now approaching to a very serious period in the progress of infection; and any inattention to what is passing on the incised part, or elsewhere, at this stage, or any ignorance betrayed either in orders, or in the execution of them, may lay the foundation of much doubt and uncertainty. If the progress of infection indicates much benignity, and the patient perseveres too long in the preparatory proceedings, he may eventually have few or no eruptions; and from hence he may afterwards be dissatisfied, or in doubt of his having had the small-pox: on the contrary, where the progress of infection shall be of the irregular and forward kind, he may be so severely afflicted by the febrile symptoms, and by a consequent abundance of pustules, as to be placed in a very precarious situation.

Examine well, therefore, the incision; remark the progress it has made within the last forty-eight hours; observe whether the indications have a more favorable appearance, or otherwise, than before; and especially whether any signs
of

of convulsion-fits are to be seen on the incision, for we may now begin to expect such, where a patient is to be attacked on or about the ninth evening from the insertion. Examine or enquire whether the glands of the arm-pit are affected or not, and if they are, when it was first discovered. Enquire also into the effects of the medicines; whether any little feverish heat prevails towards the evening, before the incision has yet indicated a speedy approach of the eruptive fever; for in such instances a harmless rash, the harbinger of success, may soon be expected, and must not, when it appears, be mistaken for a confluent small-pox. The febrile symptoms preceding the rash are duly moderated or subdued, with only a plentiful dilution of any cooling drink. If, on a view of the whole, and considering every circumstance, an opinion should be formed, that the indications manifest a benign issue, in this case an eighth part of the alterative powders remaining untaken may be omitted, or at least one of the two next following; and the purging need not be so much insisted upon. On the other hand, should appearances be unfavorable, an eighth part may be added to those alterative powders which remain to be taken, and the purging rather increased, should

should it be deemed necessary. At all events continue the diet; and should the patient be under the guidance of a nurse, especial enquiry ought to be made at every examination, that she performs her duty punctually and faithfully, as the administration of the medicines, &c. comes entirely under her immediate cognizance.— Lastly, as no allowance is to be made for waste in the quantity of powder, she should see that all of it is properly and fully taken, and in due time, according to the instructions; whereon note your observations, as before.

Fourth Examination, &c.

On the ninth day from the insertion, should we observe that the daily progressive appearances on the arm, and the present state of infection indicate an approaching mild eruption; and that the sundry medicines hitherto taken (on due enquiry) have had their desired effect, and no very sensible fever having been experienced or expected, the alterative powder may be discontinued. But should a rash have intervened since the last examination, and still continue to increase; or if, incautiously, the patient shall have caught cold from being too long on damp floors; or if by having been too much exposed

to wet weather, and the glands of the mouth are thereby become affected; in either of these cases the remaining alterative powder must be discontinued. The purging powder, however, will be more immediately necessary to be taken at the time appointed.

The indications of the arm, &c. thus propitiously presenting themselves, we may about this time expect the eruption to make its appearance; but it will, notwithstanding, be advisable for the remaining purgative dose to be repeated on the tenth morning. But should the incision have arrived at its crisis, the fifth purging dose may with propriety be omitted. The diet, at all events, ought to be continued until the fever is entirely gone off, and the eruption completely out.

We must not omit now to examine into the state of the glands of the axilla; for where they have been enlarged, and stiffness and pain is experienced, such complaints ought now to be on the decline, and wholly to go off at the termination of the eruptive fever. But should the pain and swelling of the glands continue troublesome after the ninth or tenth day, and not
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subside

subside with the eruptive fever, it will be advisable to apply to the hollow of the arm, pieces of flannel wrung out of hot vinegar. A few applications of this kind will generally dispose the tumor to disperse; but in case afterwards it be too far advanced to yield to this simple application, emollient poultices should be applied, and we may, without alarm, wait the event of a crisis, which is never of any very serious consequence. Abscesses of this sort occur so seldom, that I do not recollect to have met with more than four or five in the whole extent of my practice; they generally are the consequence of inoculating with very stale matter, which I seldom or never use, if it can be avoided.

Should the appearances of the arm at this time be less propitious, the alterative powder must be continued; and under some sluggish and very forward appearances, an eighth or quarter part may be added to the original quantity of the powders still left untaken, and the remaining purging dose ought to have its full effect.

It must not be forgotten, that whenever a few scattered pustules prematurely and unexpectedly
obtrude

obtrude themselves on the face, breast; or other parts of the body, while the incision continues in a crude state, and the fever made little or no progress, the alterative powders which remain to be taken, should be strengthened, by the addition of a quarter or one half of their original quantity; and the remaining purgative dose likewise should be so increased as that not less than seven or eight motions may be procured in the course of the day. The diet also should be much restricted; and in all cases of a strong eruptive fever, plentiful and frequent dilution ought to be enforced, especially during the night. The more cool and simple the beverage the better. Cold toast and water is generally the best diluter, and will be found more palatable, even to infants at the breast or otherwise, than barley-water, or any other small drinks, in case they can be prevailed upon to take any thing of the sort, which they may do with a little address.

If at any time, on the occurrence of an ardent eruptive fever, and much restlessness, it should not yield, in a few hours, to what has already been recommended, we should then have

immediate recourse to the following cooling laxative clysters, notwithstanding the purging dose may have amply answered its intentions only a few hours before, but especially in a state of infaney; and where the head is supposed to be much affected by pain, or a preternatural flushing on the cheeks, no time is to be lost.

Take of—Glauber salts, six drachms, rather more or less,

Hot water, half or three quarters of a pint.—Mix for a clyster, which should be administered without loss of time. This proportion and quantity is sufficient for a child of from two to twenty months old: the quantity to be increased according to age. Let the clyster be detained in the bowels as long as possible; but in case of an immediate return, repeat it directly: if the heat, fever, and pain of the head, are not sensibly abated within the course of an hour from the first application, it ought to be repeated. Should the fever be accompanied with sickness, or loathing of food, it will be advisable to add, for young children, half a drachm or a drachm of nitre to each clyster.

Fifth Examination, &c.

On the eleventh day from the insertion, where the patient has experienced little or no inconvenience from the febrile symptoms, we shall now find that the eruption will be nearly, or altogether, compleated: little therefore remains to be done, except to order the discontinuance of the medicines, should any remain, and to direct the preparatory diet to be changed when the general crop of pustules have made a little progress in vesication, which may be about the twelfth or fourteenth day from inoculation. The patient may then return to his ordinary animal diet, and his usual liquors, with much caution, however, and restraint, until the crisis be confirmed, which will be known by the pustules becoming plump, and leaving no dint on the centre of their heads. A day or two after this, merely as it is the fashion, the patient may take some laxative medicine to procure two or three motions; and it may, for the same reason, (for I know of no other) be repeated a week or ten days after: and thus inoculation, ninety-nine cases out of an hundred ends, with the patient's not having had more than that number of pustules,

Such patients as remain, and now require medical assistance, call for certain persevering exertions to carry them through the disease as favorably as those of whom we have just now taken leave. The alterative powders in an increased quantity, according to the degree of the forwardness and sluggishness of the incision, must be closely followed up to the second night of the eruptive fever inclusive, be it late as it may in its attack, provided no rash intervenes, and the mouth be not affected. The purging ought likewise to be pursued every third or fourth morning; as also the preparatory diet and drink. Copious and frequent libations of toast and water, both day and night, must not in these untoward cases be neglected, especially so long as the fever prevails; during which, the laxative refrigerating clysters also should be occasionally administered: these measures, by a steady perseverance, will soon extinguish the fever; and the disease may, notwithstanding the forwardness of the eruptive symptoms, terminate favorably and to our wishes. Should the febrile symptoms; however, not give way, nor remit much in twelve or eighteen hours, with no disposition of the patient to perspire, and the feet and ancles remarkably cold; in these cases give
frequently

frequently and plentifully of cyder-whey, or vinegar-whey, to each potion of which may be added twenty, thirty, or more drops of Mindereus's spirit; and in case of faintness, wine-whey may be given to advantage.

These crabb'd circumstances, by the bye, occur not once in a thousand instances, and when they do, we shall find the latent cause to have lurked perhaps in the nursery: it is too often the case that we have there to combat with more than disease, perverseness, self-conceit, and ignorance, and what is sometimes worse than all, deceit and neglect in the course of preparation, from whence danger is the most to be dreaded.

I shall here subjoin some GENERAL DIRECTIONS for the management of the patient after the eruptive fever, in case of a considerable crop of small-pox.

Where patients, by any accident, are uncomfortably burthened with pustules, neither keep them in a close confined room, nor in a very warm air, nor too near a fire; for this practice will too much relax them. Neither expose them to very cold air, or in any currents of it, as that

may be liable to check the necessary course of insensible perspiration. Suffer not the body to continue long costive, especially in the early progress of the eruption, lest the growth of the pustules be thus obstructed. To prevent this, cooling clysters, composed of two drachms of glauber salts, in a suitable quantity of meat broth, are preferable to any thing received by the mouth. Before the concoctive state of the pustules, diluting liquors, moderately nutritious, such as mountain wine-whey, milk-porridge, thin panada, chicken or mutton broth, with a little of the flesh occasionally, or whatever is of simple and easy digestion, may be taken by way of food. Afterwards, more nourishing, solid diet may be frequently given, but in small quantities, and of such a kind as not to render the bowels too soluble.

It sometimes happens, where the patient has caught a slight cold, that a flux is the consequence. From one to three or four table-spoonfuls of the following mixture, taken two or three times a day, will soon remove the irritation, and check the progress of the stools.

Take

Take of—Gum-arabic, in powder or otherwise,
half an ounce,
Boiling water, six ounces,
Compound powder of crabs claws, two
scruples,

Syrup of saffron or ginger, half an ounce.—Mix according to art. In cases of much restlessness and pain, from the filling of the pustules, a tea-spoonful, or more, of the syrup of white poppies, or about five or ten drops of laudanum, towards night, may be given in any convenient liquor, (if it cannot be dispensed with) to procure a little sleep, until after the crisis of the pustules; then gently purge once, twice, or thrice, at intervals of five, six, or seven days; and by these means success may be happily attained, as I have myself experienced in the most perverse and obstinate instances that have occurred to me in the practice of inoculation.

CHAP. IX.

Several Circumstances described, which sometimes take Place during the Disease, but not necessarily attached to it; such as Teething; Convulsions in Children; Casualty attending the Progress of Infection.—Ophthalmies.—The morbillous and variolous Contagion meeting together in the same Subject, and affecting him at the same Time.—Conclusion.

OF TEETHING.—*So far as its Consequences are usually connected with Inoculation at this Season.*

UPON what principle the season of teething should have been deemed improper or unsafe for inoculation, I know not, unless it be, that at such seasons, children are supposed to be more exposed to convulsions than at any other; and such occurrences I agree are very formidable and distressing. At this age also, it may have been supposed they are subject to a heavier load of small-pox, than at a future period; and therefore it has been concluded, that in this infant

infant state, and under such casualties (should they arise) there is a variety of difficulties to contend with, which do not occur at a more advanced age. Under such circumstances, indeed, I grant, that obstacles may have formerly arisen. To the practice which I am now recommending, this very age of infancy precisely, notwithstanding all the aggravating circumstances and casualties that may be thought to attend it, will, I flatter myself be found more eligible and more advisable for inoculation, than to defer it until this dangerous season is supposed to be passed. Convulsion fits, let me however remark, are not absolutely confined to this age, nor do they attach to dentition only. Children of four, five, or six years old, may also be attacked with convulsions when they are not cutting teeth, must we, therefore, especially in large populous places, wait till after that age also has elapsed, and in this long interim, risque all the anxiety of incurring the small-pox naturally, with all its usual dangers and deformities, independent of convulsions? In case of such serious attacks of the disease, it is well known that convulsions are as formidable and frequent, and even more to be dreaded that way in an unprepared

prepared state, than by the most slovenly practice of inoculation.

In what light soever, therefore, we view the case, inoculation is clearly to be preferred, precisely at the time of dentition. Besides, teething is as much a natural process and effect, as can be produced by any other function of nature; and from experience I can affirm, that it is not any way materially affected, either by the natural or inoculated small-pox. If, indeed, any sensible difference at all can be discovered or determined by practice, it is this, that the teeth are produced with even greater facility and dispatch, and attended with less troublesome symptoms, than if the patient had not been infected with the small-pox.

Casualty attending the Progress of Infection.

In the course of my practice, I have met with only six or seven instances of large crusted scabs suddenly appearing upon the incised part, on the third or fourth day from inoculation; and which prevented me from immediately determining, whether the patients had received the infection or not: however, as the scabs scaled off, by about the sixth or seventh day, and as

no inauspicious event happened from it afterwards, being at that period enabled to form a proper judgment of the indications and progress of infection, those appearances, excepting the first, gave me no particular concern. I just mention these eruptions, as such may happen to others; and by giving some little alarm to the patient may prove a temporary embarrassment to inexperienced practitioners, as they did at first to me. The cause of these sudden eruptions I cannot precisely determine. It is probable they might have proceeded from some peculiar acrimony in the habit, which just at that juncture was about to be depurated and expelled. I do not believe they proceeded from any peculiarity of the variolous matter employed for infecting the patient, because matter from the same pock was used for other patients, at the same time, whose arms were not at all affected in this way.

Convulsions, and their Cause.

Convulsion fits preceding the eruption of the small-pox, originate, I conceive, from some nervous spasmodic contractions of the duodenum, a proximate appendage to the stomach, which, from its natural shape and situation, no less than
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the stomach, under circumstances of weak digestion, and fever, or of defects in the action of the solids, &c. inclines to generate acid gas, or fixed air, when indigestible impurities are lodged in them. These being pent up, and thus rendered incapable of passing up or down, spasmodic contractions may be excited to such a degree, and so divert the blood from pursuing its natural course, as to throw the whole frame into a general convulsed state; and hence, until such obstructions are removed, the fits of course will be likely to continue.

It must have been observed, that immediately preceding, and during the fit in an infant subject, the belly of the child is always very much constipated and distended with wind. This circumstance, amongst others, induces me to believe, that these fits proceed from an unfortunate concurrence of the above-mentioned accidental causes.

Whenever such humours and dispositions are found prevalent in infants, who, either from some accident are hydrocephalous, or whose heads are too large or deformed, and the nerves of whose brain are thereby preternaturally extended,

tended, so as not to act with regular and due energy, convulsion fits are much to be apprehended; not to mention, that beside these predisposing causes, sucklings kept in a confined unwholesome air, or in a continued state of uncleanness, or whose wretched food is derived from impure or very stale sources, are subjects peculiarly exposed to convulsions.

The signs of convulsions on the incised part are as follow: about the seventh day from the insertion of the variolous matter to the attack, which generally takes place on the ninth or tenth evening, the vesicated part of the incision being depressed, containing but a small portion of lymph, with its outward edge sharpish and irregular, and a considerable number of small points being seen toward the extremity of the vesicle, resembling very small pin-holes, and of the colour of thin milk and water, little doubt remains but that the patient will be attacked with convulsions in the evening preceding the commencement of the eruption, unless seasonably prevented.

To prevent which, when the foregoing signs on the arm are found to exist, and the distant approach

approach of the fit apprehended, the operator should order and insist upon it, that his patient henceforward be kept perfectly clean, and the body frequently rubbed with the hand, be duly exercised in good air, and the unwholesome nutriment, if such we may call it, be removed. Instead of the usual preparatory purging medicines, the body in this case, on the regular days of purging, should be kept open by carminatives; such, for instance as the following:

Take of—Succotrine aloes in powder, a drachm and half;

Aromatic powder, one scruple;

Rhubarb in powder, two scruples.--Mix them together. Of this composition, an infant, in a spoonful of any convenient liquor sweetened to the palate, may take fifteen or twenty grains, more or less, in order to procure five or six laxative motions in the course of the day. It may be worked off with water-gruel, in which a tea-cupful of simple peppermint water has been added to thrice the quantity of gruel. This with an occasional use of foetid medicines, such as the following, will act as a good preventive.

Take

Take of—Salt of wormwood, one drachm ;

Tincture of wood foot, one ounce.—

Mix, and name these the FÆTID DROPS, of which fifteen or twenty may be taken twice a day in a little tea or coffee, from the first appearance of the indications of convulsions on the arm, to the eruption of the small-pox. Should this method not prevent the fit, (which it will in most cases) when the patient is attached, proceed as follows.

With all possible dispatch, administer a clyster, composed of five or six ounces of warm simple peppermint water, as much of plain water, and a drachm of the fœtid tincture, which, in case the fits do not yield, ought to be repeated. A tea-spoonful also of the following should be introduced, if possible, by the mouth.

Take of—Cordial confection, two scruples ;

Simple peppermint water, two ounces ;

The fœtid tincture and syrup of white poppies, of each half an ounce.—Mix according to art, and sign it the CARMINATIVE MIXTURE. A tea-spoonful should be repeated three or four times in the course of as many minutes, if necessary ; within which time the fit generally goes

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off. The child's belly should, in this interval also, be rubbed with hot flannels; the extremities kept free from contraction, the drefs loosened, to give a free circulation to the blood; and if the patient be of a plethoric habit, in addition to the foregoing means, apply leeches to the temples, or draw blood from the arm. These operations however are seldom necessary. The patient should be constantly kept from the extremes of heat and cold, during this violent effort of nature.

I have never tried the following experiments myself, nor have I for many years had occasion to do so; but I am much disposed to believe, that after all other means have failed, a large quantity of quick-silver poured down the throat might have the desired effect: a complete immersion of the body in warm water, and continued during the fit might also be tried, and may have its use as dernier resorts.

OPHTHALMIES, *or* INFLAMMATIONS *of the Eyes,*

Are fortuitous circumstances, equally as rare as many others connected with inoculation, and they may be considered as casualties only. They
usually

usually proceed from a short series of causes, arising out of each other. The first from an obstructed perspiration, while the patient is labouring under the first progress of a copious eruption; which obstruction, in this instance, sometimes produces a premature crisis of the small-pox; and this premature crisis sometimes also causes inflammation of the eyes; or, the inflammation may proceed simply, and in the first instance, from the patient's being imprudently exposed to strong currents of chilling air, while in a relaxed weak state, and towards the close of the disease. I cannot conceive that the inflammation ever proceeds as a primary effect, from any variolous eruption on the ball of the eye, although specks afterwards may be there seen to suppurate, and have indeed some resemblance to pustules. Let me only observe, that I never convey the infection from such eruptions.

CURE.—In what way soever this species of inflammation is produced, a tumefaction, discharge, and closing of the eyes soon follow. To remove which, first let the eye be bathed with a little warm milk and water, so as to remove the glutinous matter; then search whether the

hairs of the under eye-lash, by the patient's rubbing the irritated part with the hand, have not been thrust under the upper lid, for the contrary rarely happens. Should this prove to be the cause of the inflammation continuing, it will soon be removed, by an application of the same warm fomentation ; taking care, by duly cautioning the patient, that the hairs do not get under again by the same accident. Should the effect be of a deeper and more serious nature, bleed with leeches near to the part aggrieved, or draw blood from the arm. Cooling laxatives also must not be omitted, and occasional fomentations, such as the following, may be applied.

Take of—The infusion of red roses, two pints ;
Liquid laudanum, a tea-spoonful.—
Mix, and apply it three times a day, as hot as the cloths can with comfort be borne. In the mean time, to obtund any acrimony in the first passages,

Take of—Soft water, six ounces ;
Gum Arabic, in powder, six drachms ;
Prepared chalk, a drachm and half ;
Balsamic syrup, half an ounce.

First

First, dissolve the gum in the water, then add the other ingredients ; and of this emulsion give one, two, or three table-spoonfuls, according to the age of the patient, twice or three times a day, first shaking the vial.

Should the vision be affected, and the patient complain of seeing as through a smoky medium, when the inflammation and pain are going off, to prevent specks forming on the eye, the following ointment may be used to very great advantage.

Take of—Purified hog's-lard, one ounce ;

White preecipitate of mercury, one draehm.—Mix them uniformly together ; and the eye, for the purpose being shut, as in a state of sleep, rub over it the quantity of a large pea every night. The application of this ointment should extend upwards and downwards, from the eye-brow to the cheek-bone, and from the ridge of the nose near to the hair on the side of the head ; taking care that the ointment be not rubbed into the eye, because it will induce, for a short time, the same sensation as is occasioned by soap and water getting into the eye in

washing the face. It will be prudent to continue the ointment for a few weeks.

Observations on the MORBILLOUS and VARIOLOUS Contagion meeting together in the same Subject, and affecting him at the same Time.

I cannot call to my recollection any medical author, ancient or modern, who has noticed the diagnostic appearances which take place on a subject who has caught the contagion of the small-pox and of the measles also, at or about the same time; such an occurrence, speaking from my own experience, is extremely rare, and, as the diagnostics produced by so singular a coincidence of eruptive diseases, are very remarkable and extraordinary, and are sometimes succeeded by much danger, it seems to me therefore necessary, on this account, to describe them and their respective tendencies, together with the measures to be pursued under such a combination of infections, in the clearest manner I can. In these cases, the diagnostics, as well as the prognostics, seem to have no affinity with those incident to either disease a-part: I mean when not attached to, or connected with
each

each other, but arise from a fortuitous combination of the two.

To be thoroughly understood, I must presume the possibility of a subject's having caught the measles at or about the time of his being inoculated for the small-pox; in such case, the febrile symptoms of the measles will attack the patient about the crisis of the small-pox; the progress of the former infection proceeding slower in its course to eruption by seven or eight days than the latter.

DIAGNOSIS FAVORABLE.—Should it so happen that the crisis of the small-pox has taken place before the onset of the morbillous fever, the whole surface of the patient will, on or about the second day of the fever, begin to inflame, and a general tumefaction will immediately follow, resembling the inflation of an animal just killed and blown up by a butcher; this swelling and inflammation will continue three, four, or five days; and when they have entirely subsided, the cuticle will peel off in large flakes, or bran-like scales. These seemingly alarming appearances, from first to last,

are a sure presage of a favorable and happy event; nor ought nature to be disturbed by any applications, either externally or internally. In all the cases which have occurred to me, she has ever been fully competent to answer the purposes of perfect safety, aided only with the ordinary precautions of the nursery. A dose or two of some gentle purging medicine however, after the dead cuticle has been rubbed off, appears to be all that is necessary.

I have not met with any material variation in the diagnostics of those who have passed the crisis of the small-pox before the morbillous fever comes on, but the number of cases of this sort occurring to my recollection may not have amounted to more than six or eight.

Should the patient catch the measles some four, five, six, or more days from the insertion of the small-pox matter, after having been enjoined the use of the ordinary preparatives, medicinal and dietetic, very useful perhaps in both cases, I do not apprehend that any danger from either disease will at any time ensue.

DIAGNOSIS,

DIAGNOSIS UNFAVORABLE.—Should the small-pox not have arrived at its crisis, when the febrile symptoms of the measles commence, the small-pox pustules, in whatsoever state they may be, or however few their number (suppose fifty or an hundred only) will continue at a stand as to their variolous progress, and not proceed to a crisis at the usual time, and the centre of the pustules will also, in a few days, begin to turn a little brown, and of a livid cast, but instead of their drying away, and falling off in their usual time, every pustule will gradually spread to the size of a sixpenny-piece, or thereabout; and the outward edge thereof will appear to be filled with a matter of a whitish hue, and different from the colour of that which at its crisis is variolous. In this state, each pustule continues to form a small sphacelus, or gangrene, until the conclusion of the fatal catastrophe, which seldom takes place before the twenty-first or twenty-second day from the first attack of the morbillous fever,

It is to be observed, that during the whole of this interval, the patient's appetite continues pretty good, the sleep but little interrupted; natural stools, as to consistency, descend daily,
but

but are rather whiter than usual ; the back part of the tongue is rather furred ; and the pulse somewhat more feeble and quicker than in a natural state of health ; the face rather pallid than otherwise.

CURE, *unsuccessfully attempted*.—I have had the misfortune to experience two of these unconquerable cases. The first depended on my own abilities : the second had the joint advice of myself and the late Sir Richard Jebb ; who, in order to resist the progress of a supposed putrefaction, which to him appeared to be coming on, from the livid appearance of the pustules, directed the bark in decoction, with some acidulated cooling julep, and the mindercrus's spirit. The case, he said, was new to him, but upon the whole it appeared to him not very dangerous, and he had little or no idea of the fatal issue. The child died suddenly, and without pain, as we were informed,

CURE.—Since the foregoing case, I have met with only one instance of the kind, in which I succeeded to my wishes, by the following simple practice. Judging the latent evil might with more success be resisted by certain antiphlogistics,

tics, I advised that the patient (three years old) should be plentifully supplied with a saline mixture, and occasionally to take of rough cyder whey, made of equal parts of cyder, water, and milk ; of this, nearly two pints were drank daily for the first five days ; by this time I perceived the extended pustules began to contract, as if they were disposed to scale off soon. The child's appetite at this time began to mend, and the face which had hitherto appeared wan and pallid, began now to assume a healthy colour. However, the saline mixture and the whey were continued three or four days longer, in reduced quantities, at which time the scabs were in general peeled off. I therefore ordered a little rhubarb, to procure two or three laxative motions, and to strengthen the tone of the digestive powers ; which being repeated a few days after, and the child being perfectly restored to health, I took my leave.

CONCLUSION.

MY anxiety for the preservation of the human species, and the sincere regard I bear for the comfort and honor of a professional character, make me, I confess, reluctant to quit the subject of inoculation, until every possible vestige of danger from it be done away. I shall therefore close this Work with suggesting a few general observations, which I am fearful have not yet been fully explained. First, As it is woefully known, in the natural way of receiving the small-pox, one patient at least dies out of five or six, so we should also bear in mind, that one in that number will probably require our best abilities to bring the small-pox to a benign sort, by inoculation. Secondly, Judging from my experience, the disease is not to be subdued in any better way, or more agreeable to the patient, than by administering the preparatives to them in a state of health. Thirdly, Whenever patients come under the unfavorable indications, impress on their minds the necessity of purging well; for by so doing, danger is not to be feared; but by neglecting to enforce this necessary practice,

practice, it is to be apprehended. We had far better, therefore, insist on a few stools too many than too few: For example, should twenty-four or twenty-five stools be the total amount of the five purging powders, twenty-eight or thirty would be amply sufficient in the worst cases, provided the last dose has its full effect. The regimen also had better be continued a day or two too long, than give it up a day or two too soon; the calls of nature at such times are a good guide to us. At the close of the eruptive symptoms, never press the patient to take food, when it is evidently not well relished: nor should we neglect preparation, and rely too sanguinely on our abilities, during the worst sort of eruptive symptoms, to repel danger by the use only of febrifuge medicines administered in that stage.

This practice has been tried, I understand, on infants, probably on account of the daily difficulty of getting them to take the necessary preparatory medicines; from an idea of the impossibility of materially altering the quality and quantity of their food, and also from an erroneous notion, that, on account of their tender age, they may be considered as a class of subjects

subjects safer than adults, and not requiring this formality; or, lastly, because the eruptive fever with infants is in general more under controul.

Now, in respect to the first of these arguments, if it be one, in favor of such concise practice, I must confess I have experienced little or no difficulty with infants, at least not more than what one should expect to meet with during the fever; and as to the breast milk, or other food, that may very easily be restricted, if found expedient

With regard to the latter ideas, on this head, my experience by no mean warrants me to give a preference in particular to the season of infancy, more than what I have already noticed, nor hardly to any other age. The advocates, therefore, for this concise mode of practice when they succeed, are, I am apprehensive, more fortunate than prudent. They cannot, surely, expect so uniform a success as they would be likely to experience under a well-regulated preparatory regimen. Besides, let me candidly declare, that I never experienced any disagreeable accidents from the use of this preventive practice.

practice. Nor have I, even under what I have judged to be the most favorable personal advantages, dared to delay the antiphlogistic preparatives beyond the third or fourth day after inoculation; and in some of these trials, I have neither been fully satisfied with my conduct nor my success.

What opinion the Faculty at large may entertain of my theory, or speculative reasoning on the nature of this disease, I know not; nor am I very solicitous about it. This, however, I will say, that what I have here detailed is done with the greatest possible fidelity. Whatever, therefore, becomes of my theory, I hope the practical observations will be thought worthy of serious notice.

I have designedly not noticed some of the ordinary febrile symptoms, as unnecessary to be remarked; such as yawnings, cold shiverings, transient pains in the limbs, back, &c. The fœtidness of the breath, which is perceived to proceed from some patients, may, in some measure, be imputed to accidental causes, and not simply to the effect of the fever, because in such cases every patient, in this stage of infection, would have

have an offensive breath in a greater or less degree, according to the quantum of the fever, which, at least, my olfactory nerves have not been sufficiently keen to have made the discovery. I therefore notice this effect rather as a casualty only.

In a word, the main design of this publication, however uncouth and immedical it may be, in point of arrangement or expression, is to add something to the professional treasury; something whereon future Practitioners may erect a more distinct and fairer edifice, than I have done. One truth more may be relied upon, that every person to whom I have been long and intimately acquainted, on reading the Work, will be fully satisfied, from the style and manner of expression, that it is the genuine production of my own pen.

FINIS.

